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### Carcinoma of the Pharynx, Larynx, and Cervical Esophagus\*

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THE PROBLEMS of carcinoma of the larynx were discussed before this group four years ago. Of the adjacent anatomic areas of the pharynx and cervical esophagus, little was said. In these areas the problem of cancer had been a gloomy one with little hope of cure by accepted methods of treatment. In the belief that more satisfactory technics have now been tested sufficiently to be embraced in preference to old defeatisms, the discussion of four years ago is presented with revision.

The cure of a carcinoma so often implies sacrifice of function that carcinoma of the pharynx and the larynx has been viewed with dread by

doctor and patient.

Actually laryngeal carcinoma is a most favorable malignancy when confined within the laryngeal box. Early diagnosis coupled with adequate therapy can, for example, in a small midcord lesion, promise a 93 per cent five-year cure rate.

Forty per cent of laryngeal carcinoma occurs in the decade from fifty to sixty years of age.

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The spread, however, is from age ten to ninety years. It is predominantly but not exclusively a disease of males. The etiology is as obscure as in most carcinomas.

For purposes of discussion it is important that lesions within the glottic larynx be differentiated from those involving the extrinsic aspects of the larynx and the supra- and subglottic larynx (figure 1).

To be truly intrinsic a lesion must be cordal with infiltration confined between the ventricular band and immediate subglottic area (figure 2). The early symptom is hoarseness. Approximately 90 per cent originate on or near the free, phonating margin of the cord. A change in voice is inevitable, and in a sociable world there is no more expressive and apparent symptom. Hoarseness demands an adequate laryngeal view. False assurance and palliative measures expend valuable time and are reflected in rapid decline in curability rate.

Intrinsic laryngeal malignancy tends to be of grade 1 or 2 malignancy of the squamous cell type. There is question concerning the value of grading. Nevertheless, grade 1 and 2 may be accepted as having a better prognosis than grade 3 and 4. The extension of the lesion plus the grade of malignancy is of more prognostic value than grade alone.

<sup>\*</sup>Presented to the North Dakota State Medical Association at Minot, North Dakota, May 11, 1953.

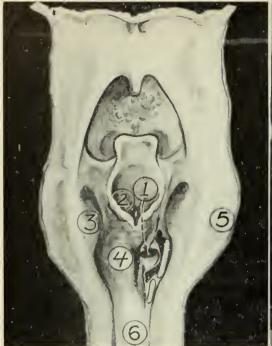




Fig. 1. Locations of laryngeal and paralaryngeal carcinoma. Only position 1 is true intrinsic carcinoma of the larynx and amenable to surgery confined to the larynx. Positions 2, 3, 4, 5, and 6 occur in a far different substrate, metastasize early, and carry a much higher eventual mortality.

Fig. 2. Intrinsic carcinoma of the larynx. The true cord is primarily and solely involved. The prognosis is superior to that in other laryngeal and paralaryngeal areas. Total wide-field laryngectomy without neck resection is adequate primary surgery.

Surgery, radiation therapy, or combinations of both are the usually accepted modes of treatment. Cody has made a signal contribution to therapy by assembling the figures in 25,000 cases reported over the last decades by otolaryngologists, general surgeons, and radiologists. Clarification in this manner is impartial and invaluable. Few medical men are blessed with the longevity and tumor volume necessary to formulate opinions as sound as those accumulated

from the many sources of diverse viewpoint.

Intralaryngeal surgery through one of several direct endoscopic approaches to the larynx has a very limited place in treatment of laryngeal carcinoma. The rare, few millimeter midcord lesion treated adequately in this manner can expect a 93 per cent cure rate.

Midline or near-midline division of the thyroid cartilage through a central neck approach, socalled laryngofissure, gives clear access to the





Fig. 3 (left). Supraglottic carcinoma. Note fullness on pharyngeal aspect indicating deep infiltration of a muscular and mucosal area rich in lymphatics. En bloc neck resection offers a better prognosis. Fig. 4 (right). Epiglottic carcinoma with rough, granular ulceration extending to the supraglottic larynx. The neck resection removed en bloc contains positive metastatic glands.

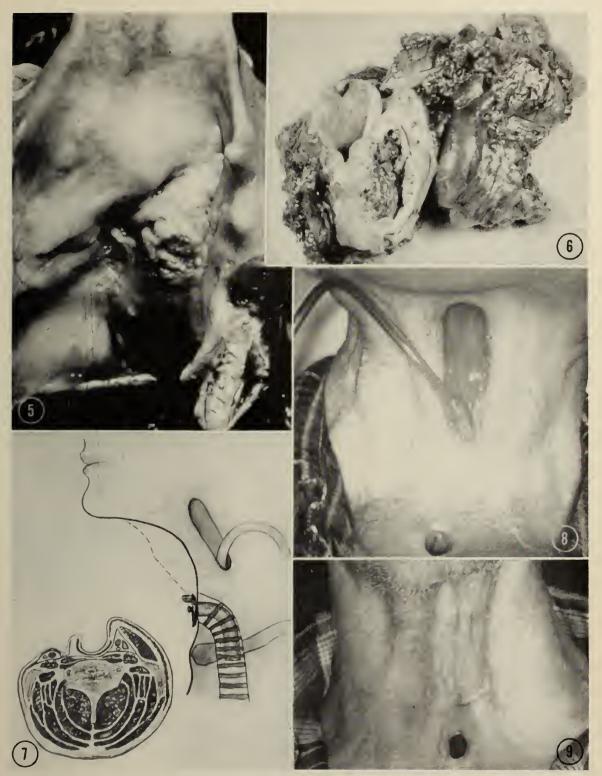


Fig. 5. "Extrinsic" carcinoma of larynx with supraglottic and pharyngeal involvement adequately excised with homolateral neck resection. Fig. 6. Postcricoid and piriform carcinoma excised with homolateral neck resection. Pharyngeal closure was possible at initial resection. Fig. 7. Pharyngostomy as necessitated by extensive laryngopharyngeal resection. Closure with cervical skin flap is done a few months after initial surgery. Fig. 8. Pharyngostomy after bilateral neck resection and laryngopharyngectomy. Closed with cervical flap three months after surgery. Fig. 9. Pharyngostomy now closed with cervical skin flaps. Patient has normal deglutition and can develop esophageal speech.

larynx and permits excision of lesions of one cord showing good metility without involvement of arytenoid posteriorly or commissure anteriorly. Those lesions reaching within millimeters of the anterior end of the cord at the commissure should be approached by the modified, so-called commissure, technic to the normal side of midline. Lesions which cross the anterior commissure to the opposite cord in any degree should not be condemned to a conservative laryngofissure, but should have laryngectomy. Adherence to these principles can produce a five-year cure rate of 76 per cent in laryngofissure lesions. Postoperative death from laryngofissure is only 2 per cent. Irradiation in this type of case offers a cure rate of 67 per cent. Irradiation has had a greater morbidity and has been attended by more complications. However, without subepithelial infiltration and fixation, these limited lesions are "cutaneous" cancers. Therefore, it can be expected that where skillful irradiation facilities are available and liaison is good between the roentgen therapist and otolaryngologist during and after therapy, more of these larvngofissure lesions can and will be treated with deep therapy. Improvement in nonsurgical cure figures with retention of more satisfactory voice has been reported from some areas where these prerequisites in selection and therapy have been met.

Intrinsic laryngeal carcinoma of wider extent than the select cases above require a total laryngectomy. It offers a five-year cure rate of 60 per cent. If cervical nodes are already involved metastatically and are removed by block dissection, the rate can still be exceedingly good. If through unwise conservatism, an unsuccessful fissure has been performed, the follow-up total laryngectomy can provide a five-year cure in only 39 per cent as compared with 60 per cent as a first procedure, while irradiation can provide a 35 per cent cure rate. If cervical nodes appear after a total laryngectomy, a block dissection can offer a 40 per cent five-year cure.

If irradiation is selected as a mode of therapy for a case which would be amenable to total laryngectomy, resection of the laryngeal cartilages to avoid the continuing misery of perichondritis is a recognized first step. Irradiation after cartilage resection can offer a five-year cure rate of 38 per cent as compared with 60 per cent for total laryngectomy. Irradiation as salvage therapy for operated cases is of some value. Salvage has been claimed in as high as 30 per cent of cases with recurrence. As a palliative measure in extensive cases, irradiation has little to recom-

mend it and it frequently increases suffering and shortens life.

Extrinsic laryngeal carcinoma originates outside the glottic larynx and may appear on the ventricular band, the epiglottis, the piriform sinus, or on the posterior aspect of the cricoid ring. Symptoms appear late. Pain, often referred through tenth nerve pathways to the ipsilateral ear, and obstructive dysphagia are most common. The lesion may be well advanced at the time of first complaint. There is no substitute for a thorough mirror examination of all hypopharyngeal complaints. Many are functional but cannot be differentiated from the far side of a consultation desk. Extrinsic lesions tend to be of grade 2 and 3 malignancy. For this reason they are sometimes spoken of as radiosensitive. Radiosensitivity should not be confused with radiocurability. They are not synonymous. Radiation cures are not only infrequent - in some roentgen therapy centers none have been recorded.

Lesions of the ventricular band and arvepilottic region, the supraglottic carcinomas, metastasize early to the deep cervical nodes of the same side. Some series have demonstrated palpable metastatic nodes in as high as one-third of these cases at the time the primary was first recognized. Of the remaining two-thirds without palpable metastases, 1 out of every 2 cases had microscopic invasion of the cervical glands shown by careful examination of the routine neck resection mass. Therefore, the only tenable surgical approach to supraglottic cancer is routine homolateral neck resection in block with the primary so the intervening lymphatic vessels are not divided by the dissection (figure 3). This thorough "first care" gives the patient a far better chance of cure than by laryngectomy alone or by inadmissable roentgen therapy.

Free-margin epiglottic lesions can be completely removed with surgical diathermy with a suspension laryngoscopic exposure. They must be of very limited free-border extent, however, and as such are rarely seen. If the lesion has extended to the tongue base, its destruction with cautery and implantation of the base with radon seeds can give a cure rate of far less than 50 per cent. The usual epiglottic lesion extends toward the supraglottic larynx. In justice to the patient, a total laryngectomy and homolateral neck resection should be urged (figure 4).

Postcricoid, piriform sinus, and lateral hypopharyngeal lesions have the least favorable outlook of all laryngopharyngeal lesions. Radiocurability is distressingly low. Progressive dysphagia, eventual gastrostomy, laryngeal extension, or

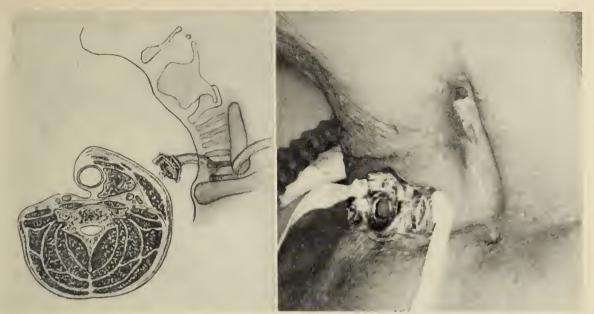


Fig. 10 (left). Details of resection of cervical esophageal carcinoma and homolateral lymphatics. Larynx has been preserved because the lesion is below postericoid level. Fig. 11 (right). Esophagostomy and pharyngostomy openings follow cervical esophageetomy and neck resection for carcinoma. Tracheotomy is preserved until closure of pharynx to preclude aspiration through retained larynx after the secondary procedure.

inferior laryngeal nerve invasion with paralysis, and eventual tracheotomy form a succession of tragic preludes to death. Routine homolateral neck dissection and laryngectomy combined with pharyngectomy (figures 5 and 6), when indicated, is a tremendous step forward in the care of these cases which have until recently been condemned to radiation therapy and eventual miserable death. A large cervical skin flap can be

utilized to join the hypopharynx to the esophagus (figures 7 and 8) and is closed in tube-like pharyngeal fashion at a second procedure (figure 9). The patient then regains his normal mode of eating and is subsequently rehabilitated with pharyngeal speech training.

Cervical esophageal carcinoma has in the past suffered the same forlorn sequence of ineffective roentgen therapy, eventual gastrostomy, and



Fig. 12 (left). Esophagostomy after closure. Tracheotomy is allowed to close. Patient now has normal deglutition and laryngeal speech. Fig. 13 (right). Barium swallowed through reconstructed cervical esophagus.

death as have the lesions of the lower pharvnx. In actual fact this lesion is far from incurable. It has a distinct tendency to limit itself to the primary site and to the regional lymphatics for a long time. Most deaths from the disease are from inanition and local extension. Widespread metastasis is the exception, not the rule. After adequate en bloc resection of the primary and the cervical glands, esophagostomy and pharyngostomy anastomosis to the neck skin is effected (figures 10 and 11). This area of cervical skin is tubed at a second procedure and normal deglutition restored (figures 12 and 13). These patients frequently have no postcricoid involvement and, hence, can retain their larynx. No significant disability follows this surgery.

Partial laryngeal removal through intralaryngeal or laryngofissure approach impairs laryngeal function but does not destroy it. The patient retains a hoarse but useful voice. Total laryngectomy brings the breathing stoma of the trachea to a permanent position at the base of the neck anteriorly and leaves no natural phonatory mechanism. Artificial voice production through a recd-like attachment to the tracheal stoma has many disadvantages including the handling of a conspicuous and messy mechanical device and the duck-like quality of the resultant speech. Phonation with an electric buzzer plate applied near the hyoid area has also the nuisance of device and batteries and the production of an abnormal tone. Eructation of small amounts of air aspirated into the esophagus can, on the other hand, produce a tone of amazing clarity which can be molded into speech in the normal manner. Esophageal specch produced in this way is an adequate substitute for laryngeal speech and is a skill within the power of the average individual to develop to a fine degree. Thus, much of the disability is removed which formerly was the penalty incurred in laryngeal surgery.

To all who deal with malignant disease, frustrations and defeat are a commonplace. Too often physicians labor diligently in surgery for hours, struggle with a patient through a difficult and trying postoperative period, and then are confronted with a recurrence, local or metastatic, when all had seemed to be going well. It must occur to all of us in our present-day handling of malignant disease that we are cutting down the tree by whittling it away a twig at a time. Until better methods are brought forward, we must continue to whittle, because it is better to attack a problem in a limited and sometimes unsatisfactory manner than not to attack it at all.

### SUMMARY

1. Laryngeal, hypopharyngeal, and cervical esophageal carcinoma appears in the practice of the average physician at some time in his career.

2. In the majority of laryngeal cases, the symptom of voice change appears early in the disease. In hypopharyngeal and cervical esophageal cases, symptoms are late in appearing and are usually localized discomfort and dysphagia.

3. The prognosis for cure of these cases is exceptionally high when contrasted with that of malignant disease elsewhere in the body.

4. The cervical lymphatic barrier tends to localize the disease to the primary site and the regional glands for a very long time.

5. The five-year cure rate declines rapidly with

delay in diagnosis.

6. The proper method of treatment is, with few exceptions, surgical. This fact is reasonably well established on statistical grounds. Details of technic vary with the location and extent of the primary.

7. Loss of speech function is no longer an ir-

remediable tragedy.

8. The reconstruction of the pharynx and cervical esophagus through the tubing of the cervical skin restores the swallowing function.

## The Value of Certain Signs in the Presumptive Diagnosis of Infectious Mononucleosis\*

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REVIEW of the literature on infectious mono-Anucleosis is apt to leave the reader with a confused picture of the clinical manifestations to be expected. For example, the current medical journals embrace numerous single case reports attesting to the bizarre syndromes found in this disease. In one article 26.6 per cent of the cases of infectious mononucleosis treated in a general hospital were listed as atypical. On the other hand, Hoagland,2 in a careful study, has stressed the constancy of the basic picture of fever, malaise, pharyngotonsillitis, and adenopathy in his patients. In his opinion the protean traits of the disease have been overemphasized. This view is more in accord with my experience. Without entering into this controversy it is apparent that the physician's success in making the clinical diagnosis depends on his familiarity with certain common basic signs. Obviously, challenging every unexplained finding encountered in practice by the promiscuous use of laboratory tests is not the answer.

Delay in diagnosis sometimes can be traced to preoccupation with some atypical sign while failing to recognize the meaning of some elemental feature of the disease. In many cases of infectious mononucleosis the pharyngitis and adenopathy are not striking in degree. Thus, the proficient appraisal of some seemingly trivial feature of a concurrent pharyngitis frequently furnishes the requisite clue to the diagnosis.

The main purpose of this paper is to describe certain fundamental signs that I consider helpful in making the presumptive diagnosis of infectious mononucleosis. Several of these have received little or no attention in the literature.

### MATERIAL AND DIAGNOSIS

The nucleus of the report is 410 students, aged 17 to 33 years, treated at the Hall Health Center, University of Washington, after January 1, 1946. Because of the accessibility of our medical service, most patients were seen at the onset of their

CHARLES E. BENDER, a 1935 graduate of Jefferson Medical College, is on the staff of the David C. Hall Health Center, Seattle, Washington. illness and thereafter examined daily. Any worthwhile appraisal of the incidence of signs in an acute illness is based upon repeated careful observations. For example, pharyngitis in a few cases was present for only a few days at the onset of symptoms, or conversely appeared for the first time after a week of fever, malaise, and adenopathy.

The criterion for diagnosis rests entirely upon the demonstration of the heterophil antibodies. All unabsorbed serum titers of 1:224 or less and all sera from atypical cases regardless of titer are subjected to differential absorption tests with both guinea pig kidney and beef cells. A titer of 1:56 on unabsorbed serum with the proper differential absorption constitutes the minimal requirement for diagnosis. Heterophil tests were positive in all cases having diagnostic blood smears <sup>3</sup>

Young lymphocytes (atypical lymphocytes) per se have but slight diagnostic value. Values up to 3,000 per cubic millimeter may be encountered in rubella, post splenectomy state, measles, varicella, infectious hepatitis, serum sickness, and mumps. In infectious mononucleosis, serial differential counts seldom fail to demonstrate at least 4,500 young lymphocytes. The few exceptions are found in patients with normal total white blood cell counts associated with a distinct splenomegaly.

### PHARYNGITIS IN GENERAL

Some of the most severe examples of pharyngitis are encountered in patients with infectious mononucleosis. As a rule, however, the pharyngitis is of moderate severity. The distress is usually less than would be expected on the basis of the clinical signs. I occasionally see patients with some tonsillar exudate or palatal enanthem who do not complain of sore throat.

Pharyngitis was present in 96 per cent of this series. In table 1, 410 cases of infectious mononucleosis are classified on the basis of the pres-

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TABLE 1
INCIDENCE OF PHARYNGITIS IN 410 CASES OF
INFECTIOUS MONONUCLEOSIS

			Cases
I	Typical – early pharyngitis – 94%		386
H	Early Atypical-pharyngitis absent dur-		
	ing the first week of illness, but de-		
	veloped later, 2%.		
	1. Malaise and headache	4	
	2. Abdominal pain, vomiting, and		
	diarrhea	1	
	3. Headache and stiff neck	1	
	4. Malaise and jaundice	1	
	5. Fatigue and periorbital edema	1	
	6. Malaria-like, chills, fever 105° F.	1	
		_	205
***		9	395
III	Persistently Atypical — no pharyngitis at anytime during the illness, 4%.		
	1. Malaise and headache	14	
	2. Conjunctivitis, lacrimal adenopa-		
	thy, nausea, and abdominal pain	1	
	•		
		15	410

cnce or absence of pharyngitis. In Group I, typical, all patients had pharyngitis and adenopathy within forty-eight hours after the first examination. Evidence of pharyngitis was noted in 75 per cent at the time of the initial examination, and developed during the next two days in the remaining 25 per cent. Pharyngitis and adenopathy, of course, did not constitute the complete syndrome in all cases. Various combinations of fever, headache, myalgia, splenomegaly, and hepatic dysfunction were present in many.

The 9 patients in Group II, early atypical, did not develop pharyngitis until some time after the first week of illness. The notations refer to the early clinical findings. All had adenopathy early and all subsequently developed pharyngitis. The 15 patients in Group III, atypical, never developed pharyngitis. The 14 patients included in the first category of Group III had various degrees of fever, malaise, and headache and represent examples of the febrile or typhoidal type of case. The last example in this group presented features augmenting the atypical cases.

The constancy of pharyngitis noted in these patients was second only to the incidence of adenopathy. Several aspects of the pharyngitis that are helpful in making the differential diagnosis are the following:

Tonsillar exudate. A pure white tonsillar exudate is the most important abnormality of the pharyngeal involvement in infectious mononucleosis. This feature has received scant recognition. Even articles devoting considerable space to a detailed classification of the various types

of pharyngitis encountered in this disease have failed to mention this white exudate. Rammelkamp<sup>4</sup> in discussing the differential diagnosis of streptococcal pharyngitis has correctly referred to the white and pasty exudate present in infectious mononucleosis. When observed very carly, the exudate exists as several white points approximately a millimeter in diameter on the surface of the tonsil. As a rule, these points enlarge and coalesce quite rapidly so that when the patient is first examined the exudate usually covers about one-fourth of the surface of the tonsil. This frequently marks the beginning of a protracted tonsillitis with the exudate increasing in extent from day to day. The physical character of the exudate is pasty rather than membranous. It can be easily removed piecemeal with a swab or curet and seldom causes bleeding. Rarely, as a consequence of coexistent bacterial growth, the exudate may become tinged. In my experience the white color is always reestablished after treatment directed against the secondary invader. This white exudate has been present at one time or another in 50 per cent of the patients with tonsils. In patients without tonsils, it sometimes caps the lymph follicles on the pharyngeal wall and twice occurred in large amounts on the lingual tonsils.

In spite of its solid consistency, when smeared on a slide, remarkably little in the way of bacteria are seen in the stained specimen. Usually a moderate number of gram-negative cocci, some fusiform bacilli and spirochetes, and rare grampositive cocci are found. Several times a small gram-positive rod with a musty odor has been obtained on culture; cultures for fungi have been negative. Epithelial and white blood cells are not numerous.

The exudate usually is confined to the acute phase of the illness but may occasionally persist for several weeks as small aggregates in the tonsillar crypts. Thus, a few white cryptic plugs may be an important clue if the patient is first examined during convalescence.

Fetid breath. The lack of reference to this feature in the literature on infectious mononucleosis is difficult to understand. This odor to some degree is present in many patients with an exudative tonsillitis. When no exudate exists, the odor is usually absent even though the pharyngitis is severe in other respects. The odor is at its height during the first forty-eight hours of fever and thereafter wanes rapidly. It is a disagreeable, heavy, musty smell often commented on by the other patients and nursing staff.

The pungent foul odor associated with Vin-

cent's tonsillitis is well-known. The smears from the exudate are loaded with fusospirochetal organisms. Smears from the white exudate in cases of infectious mononucleosis have only a few to moderate number of Vincent's organisms. Nevertheless, these may play a part in the development of this odor.

Palatal enanthem. Next in importance to the white tonsillar exudate are petechiae on the soft palate and uvula. These are easily differentiated from the erythema and red punctiform lesions present in measles and streptococcic pharyngitis (figure 1).



Fig. 1. Petechial enanthem of palate and uvula in a patient with infectious mononucleosis. Some white exudate can be seen on the right tonsil. A large mass of gray exudate is adherent to the left tonsil.

The petechiae seen in infectious mononucleosis are clustered in an area about 2 cm. in diameter, anterior to the base of the uvula. They pass through a typical series of changes. When first seen there are about 12 pin-point red lesions directly in the midline of the palate. Several hours later 25 to 50 larger dark red punctate lesions are present. Within twenty-four hours they assume the characteristic purple of petechiae. This is a transient sign and, no doubt, often missed because the mouth was not examined at the opportune time. The petechiae may retain their discrete identity for a week but in most instances fade rapidly. These lesions are present in 60 per cent of patients with a moderately severe pharyngotonsillitis but the over-all incidence is about half this. I consider this evanescent petechial rash as very important corroborative evidence of infectious mononucleosis.

Edema of the uvula. Ravenna<sup>5</sup> describes a red inflammatory edema of the pharynx leading to swelling of the uvula which appears as a semitransparent fluid-filled bag. He and others believe this is a valuable sign for the presumptive diagnosis of infectious mononucleosis.

How does this differ from streptococcal pharyngitis? Most textbook descriptions of streptococcal pharyngitis refer specifically to edema of the uvula. Loge<sup>6</sup> observed edema of the uvula in 86 per cent of his cases of streptococcal pharyngitis. When pronounced, he considered it an almost pathognomonic sign.

I have observed an edema of this sort in 15 per cent of patients with infections mononneleosis. In almost all instances it developed as part of a moderately severe pharyngitis after the disease was well established. Only rarely was edema present early and of help in making the diagnosis. The striking feature is the semitranslucent edema beginning at the tip of the uvula and extending outward into the palatine folds. The drawback which detracts immeasurably from any specificity of this sign is the fact that it is encountered in many patients who do not have infectious mononucleosis. Most of these cases can be traced to sensitivity to some ingredient of a medicated throat lozenge, to streptococcic involvement, or to a known allergic state.

With these limitations, an early edema of the uvula with a dearth of other signs of pharyngitis may occasionally be of value in the presumptive diagnosis.

### EDEMA OF THE EYELIDS

This abnormality was well described in a recent article by Hoagland.<sup>2</sup> Edema of the eyelids was noted in about one-half of this group. It appears early in the illness and lasts four or five days. This condition is seldom noticed by the patient.

Briefly, there is a sagging of the tissue in the superior portion of the upper lid down over the tarsal portion of the lid. This is most obvious when viewed from the side of the patient. The free margin of the lid too may show some swelling. Infrequently some pigmentation supervenes.

The pathogenesis of this edema is not clear. In these patients it has not been related to the degree of cervical adenopathy. A 19-year-old female treated in 1949 had edema of the entire face for five days but only moderate cervical adenopathy. The lid edema may reflect the effect of a block at a point not accessible to direct examination. The principal direct pathway of lymph flow from the lids is to the parotid group of lymph nodes. These, for the most part, are embedded in the substance of the gland and inaccessible to palpation. Perhaps the reserve adequacy of the lymph channels may largely determine which individual will develop edema.

### ADENOPATHY

Cervical adenopathy is the most constant sign found in infectious mononucleosis. Posterior cervical node enlargement without question is the finding which most often alerts the clinician to this possibility. Enlarged posterior cervical nodes were palpated in all but 3 cases in this series. In 1 case no peripheral adenopathy ever developed. In the remaining 2, however, various combinations of anterior cervical, axillary, and epitrochlear adenopathy were present. Anterior node enlargement, while usually present, has much less significance as evidence of infectious mononucleosis. Epitrochlear and axillary adenopathy, while not as common, have much more specificity as a sign of this disease. Inguinal adenopathy is rarely present to a striking degree; slight enlargement is the rule. Little correlation exists between the pharyngitis and cervical adenopathy. This is exemplified by the usual typhoidal case when an early slight pharyngitis disappears while the nodes continue to enlarge. Contrariwise, a patient with a moderately severe tonsillitis may develop but a single nontender node behind the middle third of the sternomastoid muscle or in the supraclavicular fossa.

Chest roentgenograms were not taken routinely. Approximately 150 patients in this group had chest roentgenograms, usually those with signs or symptoms of pulmonary involvement. No unequivocal example of hilar adenopathy has been demonstrated. In each instance, at least one roentgenogram taken previously was available for comparison.

The lymph nodes in infectious mononucleosis are usually only slightly or moderately enlarged. As a rule tenderness is minimal or absent. Frcquently 1 or 2 nodes less than a centimeter in diameter represent the total adenopathy. Thus, a careful survey of the posterior triangles of the neck should be made on several occasions.

### EXANTHEM

The incidence of rashes in infectious mononucleosis have been reported as high as 18.6 per cent.<sup>7</sup> Mention here is only by way of concession to tradition. Exanthems in this series have been almost nonexistent. Rubella, streptococcic disease, and serum sickness should, of course, be ruled out as the cause of the eruption. In my opinion the incidence of skin lesions in authentic infectious mononucleosis is extremely low if drug therapy can be excluded as a possible cause.

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While pharyngitis is a universally recognized sign of infectious mononucleosis, its distinctive features have not been granted satisfactory descriptions. The impression is gained from numerous accounts of this disease that so commonplace a sign is often not taken very serionsly. This is especially true when the clinical findings in some undiagnosed condition appear to be linked with dysfunction of the hepatic, hemopoietic, or central nervous systems. Thus, in practice, preoccupation with atypical findings may actually weigh heavily as a disarming factor in the early recognition of the disease.

The chief aim of this paper has been to stress certain features of the pharvngitis and adenopathy which have assisted in the early recognition of infectious mononucleosis. My experience has indicated that the association of pharyngitis and posterior cervical adenopathy is constant enough to be highly significant. If in addition to this basic combination we find a white tonsillar exudate, a presumptive diagnosis of infectious mononucleosis should be made. If such a syndrome is further fortified by the presence of a petechial palatal rash or edema of the eyelids, infectious mononucleosis is an overwhelming statistical probability.

### SUMMARY

The concept that the physical signs exhibited by infectious mononucleosis could signify any degree of specificity has heretofore been given little credence. My experience suggests that several combinations of easily recognized signs are highly specific for infectious mononucleosis.

Posterior cervical adenopathy was present in 99 per cent of this series, and pharyngitis was present in 96 per cent. Thus the presumptive diagnosis of infectious mononucleosis is warranted by the coexistence of these two basic features. When, in addition to adenopathy, the pharyngitis is characterized by the presence of a white tonsillar exudate, the diagnosis can be made with even more assurance. Moreover, this alliance plus either lid edema or a petechial palatal enanthem constitutes a syndrome almost pathognomonic of infectious mononucleosis.

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## Splenectomy for Traumatic Rupture of the Spleen\*

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Statistical data from 25 consecutive cases of splenectomy for traumatic rupture of the spleen are presented. This series includes all cases seen at the St. Louis County Hospital from 1947 through 1952. Excluded are those cases in which the spleen was removed for reasons other than rupture. It is interesting to note that two of the spleens in this series were found on microscopic examination to be diseased.

Mortality in rupture of the spleen has been reported as high as 46 per cent. No deaths were

encountered in this series.

There were 17 men and 8 women in this group. Ages ranged from 3 to 69 years. The greatest number of cases occurred among teenagers. The following is a breakdown of cases according to age and years.

Ages	Number of Cases	Years		Number of Cases
0 - 10	5	1947		3
11 - 20	10	1948		3
21 - 30	5			
	2			
	1			
	0			
61 - 70	2	1002	_	

In all patients trauma occurred on the left side of the body, usually on the lower chest and upper abdomen as evidenced by contusions and abrasions of the skin.

Features of a surgical abdomen were present in all cases. When examined, 19 patients had left upper quadrant pain; 2 had generalized abdominal pain with no localization; 1 had low localized pain toward the left flank; 1 at first had right upper quadrant pain and later pain in both upper quadrants. The latter patient had a ruptured pancreas.

A 19-year-old boy had only right upper quadrant pain. His preoperative diagnosis was a ruptured liver. However, no liver injury was found

ROBERT H. RUBY, a 1945 graduate of Washington University Medical School, is chief of surgery and medical officer in charge at Pine Ridge Indian Hospital, Pine Ridge, South Dakota. at surgery. This patient had a ruptured spleen which microscopic examination showed to be Banti's disease.

An associated ruptured liver without right upper quadrant pain occurred in 1 patient. One patient had no abdominal pain when admitted, and is the only patient not operated upon within the first fifteen hours.

Excluding a patient with delayed bleeding who was operated upon five days after admission, all others showed left upper quadrant muscle guard or generalized guard, usually maximum in the left upper quadrant except 1 patient who showed no rigidity. This exception was a 17-year-old boy with the associated rupture of the pancreas. The patient in whom a preoperative diagnosis of ruptured liver was made had generalized guard.

Other physical signs of blood in the abdomen were present. With the exception of 3 patients, no bowel sounds were present at the time of admission or a few hours later. A positive Kerr's sign was evidence of left diaphragmatic irritation in 12 patients.

The white blood cell count in each instance was raised by blood in the peritoneal cavity. The white blood cell counts varied from 12,450 to 37,250. The average was 21,280. Excluded is the patient with delayed bleeding who had a count of 10,500 when admitted. When he bled later, his white count became elevated. The rcd blood cell count was never very low. The average count was 4,100,000.

Fourteen patients were pale on admission. Larghero and Guiria<sup>2</sup> write that all of their cases of primary rupture showed paleness.

A pressure of below 110/70 was obtained on 14 patients. Five of the remaining patients had a pulse of 100 or above. The younger patients had the highest blood pressures. Other factors influencing blood pressure were the time elapsing between the injury to admission to the hos-

<sup>\*</sup>Presented at the United States Public Health Service Hospital, the Pine Ridge Indian Hospital Journal Club on September 9, 1953.

pital and the extent of associated injuries. Our patients were transfused readily to prepare them

for surgery.

Chest roentgenograms were taken of 22 patients preoperatively. Ten of the 22 demonstrated fractures of the left rib cage. Of these 10 patients, 2 had a left pneumothorax and 2 had a left pneumothorax. One other patient had a left pneumothorax and, though not demonstrated, must be assumed to have had fractures of the ribs raising the percentage to 50 per cent. In only 2 patients under 20 years of age were fractured ribs found. This corresponds to Waugh and Prior's findings that rib fractures in this type of injury are rare in children.

In those with only fracture of the ribs in the left lower chest, left upper quadrant tenderness and guarding is often present and the grunting respirations frequently seen in cases of rib fractures and ruptured spleens. However, these patients continue to have bowel sounds, and the white blood count is not elevated. The picture of paleness and shock or the fast pulse does not appear. Guarding and tenderness due to fracture of the ribs is relieved only by intercostal

blocking with Novocain.

The average time from admission to surgery was five hours and thirty-five minutes for 24 patients. Excluded is the patient with delayed hemorrhage whose rupture apparently sealed off soon after fracture of the splenic capsule. The clot must have broken loose five days later when he became ambulatory. The patient, a 44-year-old man, was in shock when he came to the hospital. He had a laceration of the scalp and a left pneumothorax. A compound fracture of the right radius, a dislocated right ulna, and a fracture of the nose were further complications. He was sent to surgery for reduction of the fracture and dislocation as soon as he was out of shock. His postoperative course was satisfactory. The fifth hospital day, when sitting in a chair for the first time since surgery, he suddenly became pale and developed air hunger. His blood pressure dropped and he developed a board-like abdomen. He continued to have an occasional bowel sound. The time from collapse to surgery was two and one-half hours. He received 5 blood transfusions during that period.

Of the 24 patients who underwent surgery in the first twenty-four hours, a 28-year-old man went to surgery thirty minutes after admission. His blood pressure was 90/70 when admitted. After a transfusion was started in the emergency room, his blood pressure began to rise. His white blood cell count was 16,600. This patient had a bilateral pneumothorax. The longest interval be-

twccn admission and surgery was fifteen hours for the 19-year-old boy with Banti's disease who presented very mild symptoms and signs at first. His blood pressure upon admission was 98/50. The white blood cell count was 22,500. Bowel sounds were heard for ten hours after admission.

Severe associated injuries and the necessity for blood pressure to rise above shock level before operation are factors which delay surgery.

Associated abdominal injuries were present in 6 patients and included: ruptured pancreas, 1; laceration of the left kidney, 2; laceration of the liver and a left brachial plexus injury, 1; rupture of the left diaphragm with herniation of the stomach into the left chest cavity, laceration of the leg, dislocation of the left ankle, and fracture of the right clavicle and left ulna, 1; rupture of the left diaphragm with herniation of the stomach into the chest cavity and a ruptured urinary bladder, 1.

Extraabdominal injuries were present in 8 patients and included: bilateral pneumothorax and fracture of the right clavicle, 1; fracture of the left humerus and laceration of the scalp, 1; laceration of the forehead and a left pneumothorax, 1; laceration of the forehead, 1; laceration of the scalp, concussion, left pneumohemothorax, and a fracture of the left tibia and fibula, 1; compound fracture of the radius, dislocation of the ulna, left pneumothorax, and fracture of the nose, 1; fracture of the radius, 1; and laceration of the forehead and a left pneumohemothorax, 1.

The incision used in 20 cases was a left upper quadrant incision: in 16 a left rectus, and in 4 a transverse incision. In the 2 cases of a ruptured left diaphragm, a thoracoabdominal approach was made. In addition, 1 of these patients had a second incision, a suprapubic incision for repair of the ruptured bladder. A patient with a ruptured pancreas and another with an associated laceration of the liver had transverse incisions across both upper quadrants. A right rectus incision was made in one instance, since the preoperative diagnosis was a laceration of the liver.

Wound disruption was diagnosed as a complication in a 61-year-old man because a "bloody fluid" oozed from the wound on the second post-operative day, though the skin edges did not separate. Because this occurred so soon after surgery, probably a small bleeder was responsible. This man was discharged on the thirteenth postoperative day.

Hospital days ranged from four for a 7-yearold boy to forty-nine for a 40-year-old woman who had a left pneumohemothorax and concussion, laceration of the forehead, and a fracture of the left tibia and fibula. Delayed discharge was due to fractures of the lower extremity.

Five patients had a hospital stay of over two weeks. Each had multiple associated injuries which were responsible for the delay in discharge. Ages of these patients and their hospital days are as follows:

A	ge													Hospital	days
	9						 							. 34	
3	5													. 20	
	0													40	
2	3													. 41	
2	8													. 18	

No patient under 23 years of age stayed in the hospital over two weeks. The more severe the associated injuries and the older the patient, the longer the period required in the hospital. With no associated injuries the average hospital stay was one week.

### SUMMARY

Statistical data are presented on 25 cases of splenectomy for traumatic rupture of the spleen seen over a six-year period. Surgery is the only cure for this condition. Today with whole blood transfusions, improved anesthetic facilities and methods, antibiotics, and a broad understanding of electrolyte problems, the mortality rate should be very low except in cases of extreme associated trauma.

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### DR. DAVID SHEMIN TO GIVE JOURNAL-LANCET LECTURE

The eleventh Journal-Lancet Lecture will be given February 16, 1954 in the Owre Amphitheater, University of Minnesota campus. Dr. Shemin, professor and head of the department of biochemistry at the College of Physicians and Surgeons, Columbia University, New York, has been selected as the speaker. Dr. Shemin has been affiliated with the biochemistry department since he received his Ph.D. from Columbia in 1938. He is well known for his work in isotope research, porphyrin metabolism, and amino acid metabolism. In addition to the Journal-Lancet Lecture, Dr. Shemin will participate in a course in Fundamental Advances in Internal Medicine to be held at the Center for Continuation Study February 15 to 17.

The first Journal-Lancet Lecture was given by Dr. Réné Dubois in April, 1941. Since then the lectures have become an annual event and through the years have brought a number of outstanding speakers to the campus.

The subject of Dr. Shemin's lecture will be "The Biosynthesis of Heme." All interested physicians are cordially invited to attend this eleventh JOURNAL-Lancet Lecture.



This department of The Journal-Lancet is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.

### Clinicopathological Conference

Minneapolis Veterans Hospital\*

Edited by James F. Hammarsten, M.D.

CASE 16

PRESENTATION OF CASE

A 37-year-old bartender was transferred to this hospital from another local hospital with a diagnosis of heart disease.

He was in good health until the spring of 1950 when he developed dyspnea, orthopnea, and malaise followed shortly by swelling of the abdomen and feet. In October 1950 he consulted a physician and was hospitalized. He was treated with a nutritious diet and digitalis. The swelling disappeared and digitalis was stopped.

He returned to work and was relatively asymptomatic until June 1951 when all symptoms recurred. He was again hospitalized and improved when given digitoxin and a salt-poor diet. Dyspnea persisted. In January 1952 swelling of the abdomen and ankles

recurred.

He failed to improve and in April 1952 he was examined at the University of Minnesota Hospitals. The physical examination at that time showed a normal blood pressure, distention of the neck veins, bilateral basal rales, an irregular cardiac rhythm with a gallop, a grade 3 apical systolic murmur, ascites, ankle edema, and hepatomegaly. The significant laboratory findings were: 1 minute serum bilirubin, 0.7 mg.; total serum bilirubin, 1.7 mg.; thymol turbidity, 4 units; and Bromsulphalein retention, 30 per cent. The venous pressure was 21 cm., circulation time from arm to tongue 65 seconds, and the vital capacity 3.9 liters. Roentgenologic examinations revealed an enlarged heart, pulmonary edema, and bilateral pleural effusions. The electrocardiograms from 1950 were reviewed. A progressive decrease in QRS voltage had occurred and the T waves were abnormal. The electrocardiogram at the University Hospitals showed low voltage QRS in all leads and the T waves were flat or diphasic. He improved slightly on a 200-mg. sodium diet, digitoxin, and mercurial diuretics and was transferred to a private hospital. The diet, digitoxin, and mercurial diuretics were continued. In June 1952 he developed anorexia, nausea, and vomiting. He was transferred to this hospital on June 26, 1952.

The past history was significant in that the patient had for the most part eliminated food from his diet and substituted whiskey for four years before he became ill. His father had diabetes.

Physical examination disclosed a chronically ill icteric man. The tongue was smooth and beefy red. He had cheilosis. There were bilateral crepitant rales. The neck veins were distended. The heart was markedly enlarged. There was a grade 1 apical systolic murmur and a protodiastolic gallop. The liver was palpable 4 fingerbreadths below the costal margin. Ascites was demonstrable and there was pitting edema of the legs, thighs, and sacral region.

The temperature was 97° F., pulse rate 120 per minute, and the blood pressure 94 mm. Hg systolic and 80 diastolic. Circulation time was 34 seconds

from arm to tongue.

Several urinalyses showed a trace of 2 plus albumin, 50 to 60 hyaline casts, occasional red blood cells, and 10 to 15 white blood cells per highpower field. The white blood cell count was 12,900 per mm.<sup>3</sup> with 89 per cent neutrophils, and 11 per cent lymphocytes. The hemoglobin was 18.3 gm. per 100 cc. and gradually decreased to 15.5. The erythrocyte sedimentation rate was 1 mm. in 1 hour. The circulating eosinophils numbered 250 per mm.<sup>3</sup>. A serologic test for syphilis was negative.

The blood urea nitrogen was 52 mg. per 100 cc., the chloride 87.6 mEq. per liter, CO<sub>2</sub> 21.6 mEq. per liter, sodium 124 mEq. per liter, and potassium 6.43 mEq. per liter. The sodium rose to 130 mEq. per liter on July 7 at which time the chloride was 80.7 mEq. per liter. The chloride subsequently rose to 108.1 mEq. per liter and the blood urea nitrogen to 138 mg. per 100 cc. Change in the CO<sub>2</sub> was not significant and the potassium was not repeated.

The 1 minute serum bilirubin was 6.6 mg. per 100 cc. and the total 11.6. The prothrombin activity was 29.5 per cent, thymol turbidity 1.9 units, cephalin flocculation 1 plus in twenty-four hours and 3 plus in forty-eight, cholesterol 101 mg. per 100 cc. with 49 per cent as esters, and serum protein 6.2 gm. per 100 cc. with 3.8 gm. albumin and 2.4 globulin.

A roentgenogram of the chest showed an enlarged heart and a small left pleural effusion. An electrocardiogram showed low voltage QRS complexes, low T waves in lead 1 and 2, and negative T waves in lead 3,  $V_5$  and  $V_6$ .

He was given a regular diet supplemented with numerous vitamins. Digitoxin was continued. An abdominal paracentesis on the fifth day yielded 8.5 liters of yellow fluid which contained 3 gm. of protein per 100 cc. and had a specific gravity of 1.013. He remained unchanged. The urine chloride excretion was 273 mg. in twenty-four hours. Beginning on the eleventh day his fluid intake was restricted to 1 liter daily and he was given 100 cc. of 5 per cent NaCl intravenously on several occasions. The first time salt was administered intravenously the rales decreased temporarily.

The daily urine output was consistently about 600 cc. One injection of a mercurial diuretic failed to produce a diuresis. A second abdominal paracentesis yielded 5.7 liters on the twenty-third day.

Throughout his hospital stay he had frequent nausea and vomiting. His temperature rose frequently to 100° F. The blood pressure remained unchanged and the gallop persisted. He was usually described as weak, cold, clammy, and cyanotic. He exhibited paranoid ideas, later became disoriented and noisy, and expired on the thirty-third hospital day.

### DISCUSSION

DR. CARLTON CHAPMAN°: I might as well admit at the outset that this patient was at the University Hospital. I remember him quite well. I am assured by Dr. Flink that this will not help me.

We start off with a 37-year-old bartender. I am told on good authority that bartenders either do not drink at all or they drink heavily. Obviously this man fell into the latter category. No one with an ordinary constitution can escape some consequences of an alcoholic intake of this magnitude. So whatever his diagnosis, alcohol must have played a role.

In 1950 he develops orthopnea and abdominal swelling and is treated with digitalis and a good diet. The signs and symptoms go along with ordinary congestive failure; but then when we look at therapy we really don't know what helped him, the digitalis or diet or both.

He was seen at the University Hospital in April of 1952 with signs of hepatic dysfunction, elevated venous pressure, prolonged circulation time, enlarged heart, pulmonary edema, and low voltage on the electrocardiogram. This is the portion of his course that I witnessed. I thought at that time he probably had primary heart disease, and we finally had to consider idiopathic myocarditis. I remember wondering about the possibility of beriberi heart disease. I am not certain that I have ever seen such a case. As it was originally described and as the description was amplified by Soma Weiss, it is associated with generalized dilatation of the heart, is a so-called high output failure, and is associated with a shortened circulation time. This man had a prolonged circulation time. If you agree with Blankenhorn of Cincinnati, this would fit with beriberi heart disease; but it seems to me that he has generalized the diagnostic criteria too much.

I am of the opinion, having seen a few alcoholics in similar trouble, that there is a type of heart disease to which they are subject, but which may not be primary heart disease at all. I have wondered if it were not something that was primarily a defect in the patient's ability to handle fluid and electrolytes. We might call that "alcoholic heart disease."

In the protocol there is the rather puckish comment that his circulating cosinophils were 250 per cu. mm. I can't imagine why that was included. I don't understand its significance. It merely tells me that this man was in the upper limits of normal regarding his circulating eosinophils. I had expected to seek some aid on that point, and I might as well do it now. My impression is that he could hardly have cortical hyperfunction, but that adrenal hypofunction is not ruled out. Is that correct, Ed?

DR. FLINK: I think we have to disregard this eosinophil count. I wouldn't interpert it.

DR. CHAPMAN: Well, it is here so I thought I should take cognizance of it; but you answered my question very well.

The serum bilirubin rose to high values and the rest of the liver function studies are abnormal. I think it probably indicates that he had primary liver disease. I interpret the low cholesterol to mean that this man was in semistarvation.

What about the electrolyte changes? Somehow the fictitious impression has grown around here that I have more than a passing acquaintance with the whole field of the electrolytes. This is completely wrong. I understand the field very poorly. My present predicament is a sign of what may happen to you if you permit an inflated idea of your ability in a given area to keep going. I should have deflated that long since. I can make very little sense out of these electrolyte changes. I made up a "Gamble diagram" and it looks strikingly similar to the "Gamble diagram" for Addison's disease. Now I suppose I should conclude that this patient has Addison's disease, but I shall not do so. To me it merely means that this patient conserved sodium chloride rather poorly. Some correction of the electrolyte imbalance was made with hypertonic saline. I would like to know what that did to his circulatory status.

A RESIDENT: He improved.

DR. CHAPMAN: That's very interesting. We could visualize this patient in several ways. We might assume that primarily he had heart disease. If we make that assumption, we will have to assume his renal and hepatic diseases are actually signs of congestion. I do not think this is reasonable. I doubt very much that congestive failure would give renal signs like these. He has white cells in his urine and had an enormously high blood urea nitrogen terminally. It points more to something involving the kidneys other than congestion. We might say the same about the hepatic signs. His serum bilirubin rose to 11 mg. If that happens in congestive failure, I have not seen it. Of course the serum bilirubin can be elevated, particularly if the patient has in addition a pulmonary infarct.

<sup>&</sup>lt;sup>o</sup>Associate professor of medicine, University of Minnesota.

Let's assume that this man had primary renal disease. A patient with renal disease might be unable to handle his fluids in a normal manner. He could then develop pulmonary edema. However, we have to consider the signs of primary heart disease that this man had. It becomes unsatisfactory to try to explain the heart and liver manifestations by primary renal disease.

Can cirrhosis do all of this? I rather think not. Patients with cirrhosis can accumulate a great deal of fluid and do it rather rapidly; but in this patient we have good roentgenographic and electrocardiographic documentation that he started off with heart disease. Then we might consider diagnosing primary disease at all three sites.

I shall assume that he had heart disease. It becomes then a matter of trying to say what kind of heart disease. One possibility is so-called idiopathic myocarditis. We might consider ordinary arteriosclerotic heart disease with gradual destruction of the myocardium. His age and the absence of pain is against that. We have to drag in primary amyloid disease, but that is a very poor guess. Subacute bacterial endocarditis must be considered. He did have a murmur and died with uremia. That is rather attractive, but not sufficiently so for me to put it on the top of the list. For the sake of completeness I should mention tuberculous pericarditis.

I think the signs for renal disease are good. What type of renal disease could be have had? In view of the information we are given, pyelonephritis would be the most probable. Evidence for glomerulone-

phritis is not good.

Finally, there is the possibility that he had some liver disease, and I think he did. I will qualify that. I don't believe his liver disease killed him. I think he is almost certain to show some cirrhosis and possibly quite a bit of fat in his liver.

That is about as far as I can go. No clinicopathological conference is complete unless we mention polyarteritis nodosa, but I am probably in deep enough already. I will say that he had idiopathic myocarditis, pyelonephritis, and cirrhosis.

A RESIDENT: You didn't mention the low blood

pressure in your discussion.

DR. CHAPMAN: Heart failure can do that. It is a serious sign. Addison's disease is the other cause for prolonged low pressure, but I don't see how we can make Addison's disease out of this case. I might ask Dr. Flink if he has ever seen an untreated case of Addison's disease accumulate fluid.

DR. FLINK: No. The presence of massive edema fairly well excludes adrenal insufficiency.

DR. BELL: Do you think that this prolonged hypotension might be producing hypoxia, damage the renal tubules, and produce uremia?

DR. CHAPMAN: I don't know.

DR. BELL: Do you think that serum bilirubin of 11.7 is too high for passive congestion of the liver?

DR. CHAPMAN: I think it is.

DR. HELLER: That's all right in congestive failure. We had one patient with a higher bilirubin.

A RESIDENT: I wonder if Dr. Chapman excludes beriberi heart disease on anything else besides the prolonged circulation time?

DR. CHAPMAN: I don't think you need anything else, if you consider beriberi heart disease to be a distinct clinical entity. I am not sure that I really do, but a rapid circulation time is a sin qua non of beriberi heart disease. Failing that, I don't really see how you can make the diagnosis unless you say, as Blankenhorn, that any alcoholic who accumulates a lot of fluid has beriberi heart disease.

DR. HELLER: I saw this patient on the ward. We thought he had idiopathic myocardial failure, which I am sure Dr. Chapman means when he says idiopathic myocarditis.

### DIAGNOSES

Clinical diagnosis: Idiopathic myocardial failure. Dr. Chapman's diagnosis: Idiopathic myocarditis, pyelonephritis, and cirrhosis.

Anatomical diagnosis: Nutritional heart disease, congestion of liver, hydropic degeneration of proximal tubules of kidney, hypoplastic left kidney, pulmonary infarct, and acute duodenal ulcer.

### PATHOLOGIC DISCUSSION

DR. GLEASON: This is the kind of case the pathologist would like to assume didn't exist. The patient was extremely emaciated. There was 1500 cc. of ascitic fluid, 500 cc. of pleural fluid on the right, and none on the left. The heart weighed 350 gm. which is normal. There were no gross abnormalities of the heart. The lungs showed only moderate pulmonary edema and a small infarct in the right lower lobe. The liver weighed 1,475 gm. and showed a very slight nutmeg change. There was a small acute ulcer in the duodenum. One kidney weighed 275 gm. and the left kidney 20 gm.

Microscopic examination of the heart shows occasional isolated muscle fibers that are degenerated. We don't know their significance. The liver showed practically no fat and no cirrhosis. The central areas of the liver are a little atrophic. Section of the large kidney showed hydropic degeneration of the proximal tubules. The other was a hypoplastic kidney. Sections of the lungs showed heart failure cells.

DR. BELL: Putting it all together I think it is beriberi heart disease. That's the best we have to offer. If that is correct, you could explain it on his alcoholism and starvation.

DR. FLINK: He did not respond to thiamin.

DR. CHAPMAN: This man did not have beriberi heart disease in the strict sense. I have to fall back on what you might call "alcoholic heart disease." It is something not nearly as specific as beriberi. I think your idea of starvation is a good one. One of the men whom Dr. Keys subjected to semistarvation lost an enormous amount of weight and then got tired of it all and began to eat heavily. In two days he presented with acute heart failure, elevated venous pressure, dilated heart, and pulmonary edema. The same thing occurred to some people after the last war when they were taken out of concentration camps and fed.

### Section on PAIN

Space usually given to the foreword in the "Section on Pain" is utilized fully by the editorial appearing on page 27. It is hoped that the editorial will be read and that the invitation extended in it will be acted upon.

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### Differential Diagnosis of Ocular Pain

HUGO L. BAIR, M.D.

Rochester, Minnesota

THE EYEBALL and its immediate adnexa are supplied with sensibility by the first or ophthalmic division of the trigeminal nerve. The midportion of the lower lid and the cheek are supplied by the second or maxillary division, and the medial and external canthal regions have overlapping supply by both the first and second divisions. In the brain stem, the cells of the trigeminal nuclei have an extensive distribution which brings them into relationship with many other sensory nuclei and with motor nuclei. These relationships and potential connections offer an explanation for the wide association of oculogenic pain with headache and with reflex responses relating to the eye as well as with the more remote responses in the head and in parts of the body.

### CORNEAL PAIN SYNDROME

The cornea is the most sensitive part of the eye and conveys sensations of touch, pain, and cold. It is richly supplied with nerves, the ramifications of which are greatest in the central anterior layers and surface. Consequently, it is extremely sensitive to pain from superficial affections. Tower has shown that the terminal ramification of a single sensory fiber to the cornea behaves as a unit distributed over 50 to 200 sq. mm. or more of cornea and adjacent sclera and conjunctiva. The terminal units of different

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fibers of the nerve trunk overlap some, but no terminal network represents numbers of fibers.

Corneal pain is poorly localized. This is partly explained by the relatively large corneal and adjacent limbal area represented by a single terminal sensory unit and the overlapping of different terminal units. In addition, impulses appear to spread easily among the cells of the trigeminal nucleus representing the rest of the eye and its adnexa as judged by the subjective spread of pain due to corneal lesions.

A small foreign body lodged on the anterior surface of the cornea produces little pain after the initial impact except when the lid rubs over it. The pain then is frequently localized with reference to the underside of the lid rather than referred to the eye itself. Small, fresh, superficial lesions in an otherwise healthy cornea, whether due to foreign body, abrasion, ruptured epithelial blebs, or localized inflammations, usually start with the sensation of a foreign body. If the lesion is greater or progresses, this simple "foreign body sensation" becomes more severe and pain more widespread until it is referred generally to the front of the eye as a whole. It then becomes associated with blepharospasm, excess tearing, and photophobia. Anesthesia of the cornea produced by one of the topical anesthetic drugs provides relief of varying degree depending on the extent or severity of the lesion.

Superficial abrasions appear to cause some of the severest and most persistent corneal pain, whereas a deep or penetrating laceration causes initial, sharp, severe pain followed by relatively rapid subsidence. Apparently both the extent of the area and the duration of the stimulus determine the severity of the pain.

Besides direct trauma from external agents, corneal pain may be produced by epithelial trauma due to spontaneous rupture of small blebs through the epithelium. This lesion usually is caused by infiltration of aqueous humor into the cornea through endothelial leakage. Recurrent erosion of the cornea, usually posttraumatic, also gives typical corneal pain which commonly occurs during sleep. Its mechanism is not understood, although a plausible explanation is that the original traumatic lesion is poorly healed and imbibes fluid from the fresh tears. An epithelial bleb results which finally ruptures and causes the typical pain. Its common occurrence during sleep is explained by the theory that during waking hours evaporation of tears from the corneal surface leaves a too concentrated and thus too hypertonic film of tears on the surface to be imbibed. Whereas when the lids are closed, this does not occur and imbibition is possible.

Actinic keratitis causes a characteristic corneal pain syndrome. The severe pain occurs generally eight to ten hours after exposure to ultraviolet radiation and is accompanied by intense photophobia, lacrimation, and blepharospasm. Topical anesthesia provides relief.

### CONJUNCTIVAL PAIN

The conjunctiva is relatively insensitive when compared to the cornea. Its threshold for pain is much higher and it has better sensation to touch and much better localization than the cornea. The pain of conjunctivitis, however, is rather diffuse and more of a burning, smarting type. When severe, like corneal pain, it may also give rise to photophobia, lacrimation, and excess blinking or even blepharospasm.

### SCLERAL PAIN

The sclera has a relatively high threshold to pain and pain of scleral origin is poorly localized. Aside from trauma, the commonest conditions causing pain from the sclera are scleritis or episcleritis and increased intraocular pressure.

### PAIN FROM THE IRIS, CILIARY BODY, AND INFLAMMATORY CONDITIONS OF THE EYE

It is well known among eye surgeons that the iris is sensitive to stretching. Pain from this cause is deep-seated in the eye. Normal activity of the iris, however, even a sharp pupillary contraction to bright light, generally does not cause

pain, although it may contribute to the instantancous or momentary discomfort of sudden exposure to a relatively bright light. Excessive pupillary constriction caused by a strong miotic drug frequently causes a dcep, dull, ocular ache or pain that usually spreads to cause a headache on the side of the affected eve. Wide dilatation, however, causes no discomfort. But attempts to dilate the pupil against the resistance of posterior synechiae by active dilators, such as epinephrine injected subconjunctivally or 10 per cent Neosynephrine used topically, usually cause pain deep in the eye or spread to affect the entire region. In the presence of congestion of the iris due to iritis, topical applications of atropine may cause little or no discomfort if posterior synechiae are present, because atropine is not an active but only a passive agent for pupillary dilatation. Its action is merely to paralyze the iris sphincter, thus allowing the relatively weak sympathicotonic dilatation to occur.

In my experience, the pain associated with iridocyclitis seems to be due to two factors: (1) basically the inflammatory congestion of the affected tissue which consists both of vasocongestion and tissue edema, and (2) action of the musculature due to the light reflex and accommodation in the presence of the congestion. Atropinization of the eye eliminates or at least minimizes the second factor. However, even in the well-atropinized eye, a variable amount of steady pain is experienced which is dependent on the intensity of the congestion and is independent of exposure to light.

In this connection, inflammatory congestion should be distinguished from simple vasodilatation. Schumacher has shown that, in the skin, inflammation causes pronounced lowering of the threshold for pain whereas simple vasodilatation produced by nicotinic acid does not. He attributed the increased sensitivity to pain not to erythema but to other changes occurring around and affecting the end organs in the skin. He also demonstrated that ingestion of acetylsalicylic acid abolished the lowered threshold for pain produced by inflammation.

It is reasonable to expect similar phenomena to occur in the eye. In the presence of acute iridocyclitis, uveitis, or other acute inflammation, the eye is definitely tender to pressure and in general more sensitive to all noxious stimuli. Even in the absence of definite exogenous stimuli, endogenous stimuli can cause ocular pain in the presence of such a reduced pain threshold. There may be a throbbing pain which is presumably due to the vascular pulse. The tonic pressure of the lids and the tension of the extraocular muscles on the inflamed eyeball also must contribute to the pain associated with inflammatory congestion of the eye.

These pains are referred to the eyeball primarily but with increasing severity involve the entire orbital content, the frontal regions, and even the entire half of the head on the side of

the affected eye.

Inflammation of the orbital portion of the optic nerve also causes deep orbital pain but only on rotation of the eye. The optic nerve itself has no sensory representation except for vision. So, pain probably arises entirely from the sheath.

### PAIN DUE TO INCREASE OF INTRAOCULAR PRESSURE

Tower has shown that increase of intraocular pressure in the laboratory animal intensified the spontaneous electrical activity in leads from the long ciliary nerves, and that this intensification occurred as a result of impulses arising in both the cornea and the sclera. If this is taken as indicative of the effect of glaucoma in the human eye, then all parts of the eyeball, including the cornea, must share in producing the pain. In the human eye a temporary increase in intraocular pressure produces pain. This may be brought about by simply compressing the globe by means of which the pressure may be raised to a high level, for example, to 75 mm. of mercury or more. This fact indicates that merely stretching or increasing the tension in the coats of the eyeball can produce pain. The pain occurring with acute glaucoma probably is dependent both on the intense fluid and vascular congestion produced throughout the eyeball as well as the sustained increase of pressure.

The pain of acute congestive glaucoma is a deep ocular pain which with increasing severity involves the entire half of the head on the side of the affected eye. It may vary from a dull to a severe hemicranial headache and be accompanied by moderate tearing and photophobia. It is always associated with blurred, foggy vision and rainbowlike halos are seen around point sources of light due to edema of the cornea. In children or infants, pain or headache may not be a complaint but vomiting is common.

Whether chronic simple or noncongestive glaucoma can ever cause pain or headache is debatable. It seems definite, however, that the ocular threshold for pain or headache may vary considerably. Therefore, it appears plausible that in a rare instance pain or unilateral headache may be caused by chronic noncongestive glaucoma. Reduction of the intraocular pressure to normal and relief of the pain or headache by miotic drugs seem to confirm this possibility. It must be borne in mind, however, that in adults of the early presbyopic age group and in younger adults who have uncorrected hypermetropia, the use of miotic drugs may relieve symptoms of ocular pain and headache due to excess accommodative effort and thus give a false indication of the meaning of such a test.

### PAIN FROM EXTRAOCULAR MUSCLES

Pain may originate in the extraocular muscles as a result of exogenous traction like that applied at operation. Crushing or cutting the muscle, however, seems painless at least under operative conditions in which only light surface anesthesia is used. - Excessive contraction under the influence of forced, conjugate gaze also causes pain which is referred vaguely to the side of the orbit on which the excessively contracting muscles are situated. Likewise, prolonged contraction of even moderate degree will produce similar vague aching pain. Whether these pains originate in the muscle fibers, the tendons, at the origins and insertions of the muscles, or possibly from all these, is not known.

Many persons experience occasional short stabbing pains in one or both orbits which are generally referred to the eyes. These pains are probably due to short involuntary spasmodic contractions in one or more of the extraocular muscles.

Pain or headache associated with clinical heterophoria is a vague entity. Many patients with definite or pronounced lateral or vertical heterophoria have no complaints associated with sight while some others, even with only small degrees of muscle imbalance, seem to suffer consistently from headache.

Symptoms attributed to muscle imbalance are usually headaches which may involve the brows, frontal region, or the occipital and suboccipital regions or all of these. These headaches usually are dull and steady. Electromyographic studies of the muscles of the scalp and neck indicate that the mechanism behind these headaches probably is sustained contracture or spasm in these groups of muscles. This sustained spasm or contracture does not seem to be a reflex response to the use or overaction of the ocular muscles but seems more likely to be simply a

part of an extensive tonic muscular accompaniment to mental stress or concentration without the varying reciprocal muscular relaxation which is associated with voluntary movements. The same types of headaches occur under the same conditions in many persons with no demonstrable ocular muscle imbalance or other ocular dysfunction. In fact, even with the eyes closed, mental concentration and stress induce these same types of headache and a feeling of eyestrain which may be relieved immediately by reversion to memory thoughts or day-dreams.

In the demonstration of ocular muscle imbalance of the heterophoric type as distinguished from the paretic type, the basic principle is to prevent binocular visual fusion. Many oculists refer to the relative position of the eyes under these conditions as the fusion-free position. It is not really known that heterophoria as thus demonstrated requires an abnormal contraction of any of the extraocular muscles in order to obtain or maintain normal binocular vision. The expression ordinarily used is that the "heterophoria is overcome" when normal binocular vision is obtained. This implies abnormal resistance, by virtue of the heterophoria, to maintaining the cyes in the position required for normal binocular vision and that, therefore, abnormally great contractions of the proper muscles are required. However, aside from the facts that any such extra contraction needed to overcome heterophoria would be very small and that the reserve force of contraction, in the absence of paresis, of an extraocular muscle is much greater than any such extra effort would require, the symptoms of pain or discomfort that definitely can be associated with excessive contraction of extraocular muscles do not accompany heterophoria. Therefore, there seems little reason to believe that "overcoming heterophoria" is the basis for the types of headache commonly attributed to it.

Attempts to simulate heterophoria artificially by the use of prism spectacles in normal individuals have been inconclusive with respect to the symptoms produced. The results of putting vertical or horizontal prisms before the eyes in several subjects were inconsistent according to Eckardt, McLean, and Goodell. Simons, Day, Goodell, and Wolff reported that use of vertical prisms for 3 subjects caused frontal and suboccipital pain in 2 of them and no definite symptoms in the third. The third subject, however, had myographic indications of contraction of the muscles of the neck but no pain. Ogle

and Prangen have had normal subjects maintain fusion with as high as 6 diopters of vertical prism before their eyes for longer than an hour without producing pain, discomfort, or headache.

This problem involves basically the question of the nature of heterophoria which is not within the scope of the present paper. It is doubtful, however, that any direct or characteristic ocular pain or headaches are produced by natural heterophoric imbalances of the extraocular muscles.

### SYMPTOMS ASSOCIATED WITH REFRACTIVE ERRORS AND ACCOMMODATIVE ABNORMALITIES

In youth and childhood the accommodative power is great and can easily compensate for a moderately large degree of natural hyperopia without undue effort. It gradually decreases with age until eventually it reaches the point, depending on the degree of hypermetropia, at which it can no longer compensate for the latter. The vision then simply becomes blurred. For distance vision, the hyperope must exercise a more or less constant amount of accommodation. Unless this constant accommodative effort is near the patient's limit, it generally causes no symptoms. If near the limit, it usually fails to be sustained and accommodation then simply relaxes and allows the vision to be blurred for all distances without any significant discomfort.

But in cases of hyperopia in which the accommodation can easily and comfortably maintain clear distance vision, symptoms of discomfort in the eyes and headaches may occur in near vision when the accommodative effort approaches its limit. Such accommodative effort in near vision is sustained only for relatively short periods, but the symptoms are roughly proportional to the duration and the amount of effort. However, wide individual variations exist.

Artificially produced hypermetropia by the use of convex lenses produces generally the same type of symptoms as natural hypermetropia but usually with less hypermetropic error.

In the case of hypermetropia, both natural and artificial, the symptoms seem to be explained simply by the unaccustomed excess of accommodative effort called forth. This seems to explain especially the deep ocular pain and deep headache that are characteristic. In addition, however, pain of the scalp and suboccipital portion of the neck also frequently occurs and is indicative of sustained fixational contracture in the respective muscles. This latter type of pain is not characteristic of hypermetropia or excessive accommodative effort. It is not produced as a

consequence of the ciliary hypertonicity caused

by strong miotic drugs.

Astigmatism causes blurred vision but only the hypermetropic type is apt to cause symptoms of ocular pain or headache. This seems dependent on the accommodation called forth in an effort to satisfy the demand for clearer vision. The occurrence of astigmatic or meridional accommodation in an attempt to correct the astigmatism itself is extremely doubtful. Myopic astigmatism and simple myopia cause headache only through the associated mental stress and concentration involved in the act of seeing.

So-called eyestrain is a vague entity. With corrected refractive errors and normal function of ocular muscles, it still may occur. It seems to be represented symptomatically by the aching and pain associated with sustained fixational contracture not only of the skeletal muscles of the head and neck but also of the extraocular muscles. The act of seeing involves not only visual perception but continual fixational efforts of extraocular muscles and muscles of the neck.

The "drawing pain" referred to the eyes or behind the eyes, which is common among patients who complain of eyestrain, probably is due to more or less tonic activity of the extraocular muscles and even the orbicularis, brow, and frontalis muscles. It is not necessarily indicative of ocular fault, but exaggeration is to be expected in the presence of any such fault that increases the effort of seeing.

### PAIN CAUSED BY PHOTOPHOBIA

With normal eyes, sudden exposure to much increased diffuse or focal brightness causes generally only momentary discomfort which disappears rapidly as adaptation to the light occurs. This is normal and is rarely considered painful except possibly by psychoneurotic individuals. Prolonged exposure to diffuse glare as in the desert or on the open ocean may cause headache about the eyes due to maintained contracture of lid and brow muscles in the act of squinting. The pain of snow blindness is due to ultraviolet radiation which has been mentioned.

True photophobia is sustained ocular pain due

to exposure to light sometimes of low brightness. The size of the pupil is generally of no significance. It is accompanied by blepharospasm and excessive lacrimation. It requires (1) perception of light and (2) an irritative condition affecting the distribution of the ophthalmic branch of the trigeminal nerve. Lebensohn stated that vasodilatation affecting the iris through the axon reflex mechanism is an essential component of photophobia. Eckardt, McLean, and Goodell, however, expressed the opinion that the entire central mechanism of the trigeminal nerve, including the mesencephalic root and nucleus together with the optic nerve, constitutes the neural mechanism for photophobia. They found that photophobia was relieved by surface anesthesia of the eye but not by mydriasis or cycloplegia. They also found no evidence for photophobia in the presence of Argyll Robertson pupils, and concluded, therefore, that fibers going to the pretectal nuclei are concerned.

### OTHER TYPES OF OCULAR PAIN

Rarely, trigeminal neuralgia may start in the ophthalmic division of the trigeminal nerve. Pain and congestion of one eye and excess lacrimation are part of the so-called syndrome of histaminic cephalgia. Many headaches not directly involving the eye, however, may include the region of the orbit and thus be indirectly referred to the eye also. Congestive disturbances in the nasal mucosa affecting the ostia of the sinuses may cause pain referred to orbital regions.

With the exception of the nasociliary nerve, which sends branches both to the ethmoidal region and to the eye, no path is known for the reference of pain from nasal regions to the eye proper. The so-called syndrome of the nasal nerve, in which irritative stimuli from the nasal mucosa are supposed to cause inflammatory reactions in the anterior segment of the eye, is not well defined and is not generally accepted as a distinct entity. In my experience, cocainization of the nasal mucosa on one side does amcliorate transiently the inflammatory reaction in a large variety of affections of the anterior segment of the eye but has little effect on ocular pain.

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### Somatic Head Pain from the Standpoint of the Rhinologist, Otologist, and Laryngologist

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DAIN associated with inflammation of the phar-I ynx and the ear usually is connected so obviously with the disease of its origin that it occasions little interest in itself. Pain associated with the nose and the nasal accessory sinuses, however, especially in some of the chronic disorders in this region, has been the subject of considerable interest because of its frequency. The difficulty of interpretation adds to the difficulty in treatment. The recent tendency has been to relegate the origin of many such pains to the psyche. It has been found, however, that when the physician takes a little more care in obtaining a history, in doing an examination, and in selecting treatment, many of these patients can be spared the inconvenience of a visit to the psychiatrist and their complaints can be relieved by physical means. However, the influence of emotional states in precipitating some of these syndromes should not be overlooked entirely.

Some pain in the pharynx and ear is of obscure origin and is, therefore, of interest. In this presentation, the ordinary superficial pain found in association with inflammation of the ear and pharynx will not be considered, nor will such sources of pain as the major neuralgias.

### TYPES OF PAIN

In a consideration of somatic pain originating from the structures of the face, the nasal cavity, the pharynx, and the ear, one of the puzzling features has been the question of referred pain. In general, somatic pain locates the site of irritation. However, this is frequently untrue in pain arising from the ear, the throat, and especially the nose and its adnexa.

The investigations of Lewis¹ indicated the existence of two types of pain, superficial and deep. Superficial pain arises from stimulation of the skin or exposed mucous membranes. Deep pain arises from stimulation of deeper structures, such as muscle and blood vessels. He noted that pain-

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ful stimulation of the skin, mucous membranes, and superficial tendons produced pain of a bright, burning quality that was well localized. Such pain varied in intensity but not in quality.

Conversely, Lewis found that painful stimulation of deeper structures produced pain that was disagreeable and continuous. The quality of such pain was indescribable but the pain was distinctive. He considered it impossible to confuse pain from superficial and from deep structures. He was of the opinion that the difference between the qualities of superficial and of deep pain is clear. The former is confined almost exclusively to skin, mucous membranes, and superficial tendons, while the latter is confined to deep structures, such as muscle and blood vessels. He stated that it is perhaps an error to classify both sensations under the one word "pain." It is a matter of usage, since these two feelings do not possess the common properties that use of a single term implies.

Lewis<sup>2</sup> emphasized the well-known facts that painful stimulation of superficial structures awakens quick protective reflexes and is associated with brisk movements, increased pulse rate, and a sense of invigoration. Painful stimulation of deeper structures, on the other hand, is associated with quiescence, a slowing of the pulse, a decrease in blood pressure, and often nausea. The last phenomenon is responsible for the common designation "sickening," which is applied to this type of pain but never to superficial pain.

According to Lewis, the most important difference between these two types of pain is the fact that superficial pain locates exactly the site of stimulation, whereas deep pain is apt to be felt at a distance from the source of stimulation or to be referred. Such reference was found by Kellgren<sup>3</sup> to be to myotomes, rather than along the segmental innervation of the skin. Deep pain does not appear to be referred to cutaneous surfaces but rather to deep structures, and deep pain appears to be confused by patients with pain arising directly from these other structures.

These findings of Lewis and of Kellgren explain much of the confusion that exists in the interpretation of pains arising from the structures of the nose, throat, and car since most of these pains are deep and tend to be referred.

Simons and associates<sup>4</sup> found that sustained pain in the head, by a reflex mechanism, produced a chronic state of tension in the muscles of the head and neck, which can be a secondary source of pain.

The distinction between superficial and deep pain has been emphasized because if the physician can be sure of which type of pain the patient is suffering, the problem of differential diagnosis is simplified. Also, the site of the pain does not necessarily indicate the site of the underlying stimulus.

### SOMATIC PAIN FROM IRRITATION OF THE NASAL AND SINAL MUCOSA

On stimulation of the mucosa of the nasal chambers and sinuses, McAuliffe and associates<sup>5</sup> found that the following three types of pain were produced: (1) a localized burning pain, (2) a deep pain referred to the temple and zygomatic region of the homolateral side, and (3) hyperalgesia of the skin associated with slight dilatation of the capillaries on the homolateral side of the face.

These three types of pain agree with the clinical findings in inflammation of the nasal and sinal mucous membranes. In the acute stages of rhinitis and sinusitis, the pain is of a burning type and is well localized. Although the mucosa is reddened and engorged, little evidence is present of involvement of the deeper layers of the mucosa or generalized swelling. In the later stages, the pain changes to a deep type and tends to be referred to forehead, temple, or zygoma. At this stage, the nasal mucosa is swollen and engorgement of the deeper structures is evident; purulent secretion is present in the nose and sinuses.

These observations may be correlated with the experimental findings of Behnke,<sup>6</sup> who subjected the nasal and sinal mucosa to positive and negative pressures. A relatively negative pressure, he discovered, caused superficial engorgement of the mucosa and produced a superficial, burning, localized type of pain, whereas a relatively positive pressure affecting the deeper structures in the submucosa produced a deep, referred pain.

McAuliffe and associates found that the pain produced by stimulation of the mucosa of the interior of the sinuses was slight, whereas that produced by stimulation of the nasal mucosa was severe. They considered engorgement of the turbinate tissues a major factor in the production of pain in disease of the nasal sinuses. The pain is caused by pressure of two mucosal surfaces coming in contact with one another. From their experimental findings they reasoned that the alleviation of pain in sinusitis depends on decongestion of structures impinging on one another in the nasal chambers. They believed that removal of secretions and growths from the interior of the nasal sinuses is of little value so far as relief of pain is concerned and is to be avoided.

This position is substantiated only partially by clinical experience. While, as a rule, the pain of acute sinusitis is due to contact of mucosal surfaces in the nasal chambers, and while chronic sinusitis, polyposis, and osteomas in the sinuses are usually painless, exceptions do occur. Occasionally suppuration in a sinus produces severe, referred pain when contact between mucosal surfaces in the nasal chambers is not present. This pain cannot be relieved by shrinking and anesthetizing the nasal mucosa. However, such pain can be relieved by washing out pus or removing an osteoma or a mucocele from the sinus. It is certainly true that the diagnosis of sinusitis cannot be made by observation of the localization or the periodicity of pain. Elaborate tables for localizing sinusitis by observations of the time of daily onset and disappearance of pain and the localization of pain are not dependable.

McAuliffe and associates performed a valuable service when they demonstrated the regions of reference of pains originating from irritation of various parts of the nasal chambers and sinuses. They found that stimuli applied to the anteroinferior portion of the nasal septum, the lateral wall, the maxillary sinus, the middle and inferior turbinate bones, and the ostium of the maxillary sinus, produced reference of pain to the malar and zygomatic regions of the face. Stimulation of the mucosa of the sphenoidal sinus produced a slight degree of pain at the vertex of the skull.

Eagleton<sup>7</sup> pointed out that reference of pain to the occipital and nuchal regions, so often described as characteristic of sphenoiditis, occurs only when the body of the sphenoid and especially the occipital bone are involved in osteomyelitis. Druss<sup>8</sup> noted reference of pain to the same regions when pharyngeal bursitis was present.

### NASAL-CONTACT HEADACHE

A rather severe and puzzling pain is produced occasionally by pressure of the nasal septum

against the superior and posterior aspect of the middle turbinate bone. Such pressure is apt to produce a deep aching pain in the midline of the forehead or in the eye. Such pains can be relieved by careful and complete anesthetization of the areas of contact; this procedure often gives long and lasting relief. However, if the pain tends to recur after anesthetization, surgical removal of the structures producing the pressure will be necessary.

Pressure of a septal spur in the sphenopalatine region near the posterior end of the middle turbinate bone can produce, apparently by reflex mechanism, temporal or malar pain of a vasodilating type. Neither operation alone nor treatment with vasodilators alone relieves such a pain. The two methods must be combined.

### SLUDER'S SYNDROME

Sluder described a unilateral pain in the head, the "lower half headache," starting in the region of the infraorbital foramen and often referred dorsally along the zygoma to the postauricular region and down into the base of the neck. He found that this type of pain could be relieved by anesthetization of the sphenopalatine ganglion by injection and also by anesthetization of the nasal mucosa in the region just posterior to the posterior tip of the middle turbinate bone on the same side as the pain. Sluder considered this pain to be caused by antidromic impulses traveling by way of the parasympathetic fibers passing through the sphenopalatine ganglion. Accordingly, he termed it "sphenopalatine ganglion neuralgia."

In a review of the literature on transmission of painful impulses by the autonomic nervous system, Higbee<sup>10</sup> pointed out that transmission of pain by fibers of the autonomic nervous system could not be confirmed by any investigators. He came to the conclusion that, whatever the cause of the pain and its method of transmission in Sluder's syndrome, it could not be due to involvement of the parasympathetic nervous system. Luedde<sup>11</sup> stated that the explanation for the relief of Sluder's headache, as well as of the ciliary spasm occasionally found associated with it, is not found in the correction of dysfunction of the sphenopalatine ganglion. Instead, it apparently depends on the presence of accessory sensory fibers from the fifth cranial nerve that pass through the ganglion without being part of its true ganglionic structure. Such sensory fibers, he pointed out, may be blocked effectively by direct application of cocaine in the region of the sphenopalatine ganglion. Dysart<sup>12</sup> believed that the healing power of cocaine lay in relief of vasomotor spasm of capillaries reflexly affected by irritation in the sphenopalatine region.

Peritz<sup>13</sup> noted the association of "neuralgic" pain with myalgias in the region of the head and neck over points at which nerves and blood vcssels perforate the skull. I<sup>14</sup> pointed out the frequent association of tender regions in muscles about the head and neck with vasodilating pains. I<sup>15</sup> also noted that occlusion of the external carotid artery by pressure on the homolateral side of the neck greatly or completely relieved the pain of sphenopalatine-ganglion neuralgia. This pain came flooding back when the pressure was released. It is thought, therefore, that the genesis of sphenopalatine pain can be explained completely by considering it a vasodilating pain involving branches of the sphenopalatine artery produced by a reflex mechanism transmitted through pain fibers from the mucosa of the nose in the sphenopalatine region. Like all pain arising from blood vessels, the pain of Sluder's syndrome is of the deep type.

### SINUS HEADACHE

Many investigators still are convinced that suppurative disease in one of the paranasal sinuses produces a characteristic deep referred type of pain that may persist even after the suppuration has disappeared.<sup>16</sup>

One type was described by Lewis. This was the characteristic hyperalgesia occurring in the malar region that persisted after acute sinusitis. Lewis attributed this type of pain to sensitization of the region during the acute stage of infection, whereby exposure to a preferred stimulus resulted in the release of H substance that in turn produced localized vasodilatation. Much valueless surgical intervention in the paranasal sinuses has been done in an attempt to relieve such pain on the hypothesis that concealed infection was present. Nonspecific desensitization should be effective treatment for most patients.

Another type of deep referred pain is more commonly termed "sinus headache." This pain arises from the muscles about the head or neck and is seen when secondary infection has been superimposed on primary allergic rhinitis. I have encountered patients who had deep referred pain characteristic of "sinus headache" with clinical evidence of nasal allergy but without sinusitis; still others presented no evidence of either nasal allergy or nasal infection. Examination of patients who complained of such head-

aches disclosed that tender places in muscles about the head and ncck could be found. When these tender spots were irritated by appropriate stimuli, the "sinus headache" appeared or was exacerbated. Therefore, the most common variety of somatic head pain which was termed "sinus headache" by patients was considered due to a "physical allergy" type of autonomic dysfunction and was relieved by vasodilators.

### VACUUM FRONTAL HEADACHE

Pain in the frontal sinus supposedly caused by trapping of air in the frontal sinus with later absorption of the air was described by Sluder. Hilding<sup>17</sup> has described a mechanism by which pain of this type could be produced by ciliary activity on successive plugs of mucus, forcing the air out through the nasofrontal duct. Ballenger and Ballenger<sup>18</sup> recently stated that the decrease in tension produced in a sinus by such physiologic methods was too slight to produce pain. However, it is well known that active suction on the nose can produce pain in the region of the nasal sinuses, and that burning, superficial pain located directly over the frontal sinus can be relieved by measures tending to open the nasofrontal duct.

### PHARYNGEAL MYALGIA

The pain of acute pharyngitis is of the burning quality associated with irritation of the surfaces of mucous membranes and is similar to that of tonsillitis. Because this pain is associated with visible inflammation in the mucosa, the cause is obvious. However, a deep referred type of pharyngeal pain, not associated with any obvious or visible changes in the pharyngeal mucosa, has puzzled many physicians. Patients who have this disorder complain of severe pain when swallowing which tends to be referred toward the vertex of the head. To their great annoyance, many such patients have been told they were psychoneurotic. The pain is usually unilateral or at least much more severe on one side than the other. The cause of the pain is discovered readily by palpation of the posterior pharyngeal wall. The superior constrictor muscle on the involved side of the pharynx will be found exquisitely tender to touch.

### GLOSSOPHARYNGEAL NEURALGIA

Glossopharyngeal neuralgia is a superficial burning type of pain in the same region involved by myalgia. It can be differentiated readily from the latter by the fact that deep tenderness is not present in the muscles, although trigger

zones may be confused with tenderness. In addition, thorough cocainization of the affected mucosa completely relieves the pain of glossopharyngeal neuralgia for as long as the anesthesia persists, whereas anesthesia of the mucosa has no effect on pharyngeal myalgia.

### THE STYLOHYOID SYNDROME

A sharp, stabbing, unilateral pain referred to the ear on swallowing is frequently considered by the patient to be due to a foreign body, such as a fish bone, in the region of the tonsil or pharynx. The pain can be reproduced often by palpation of an elongated styloid process in the tonsillar fossa and has been credited to pressure by such an elongation on the sympathetic plexus around the carotid artery. Surgical removal of the styloid process has been advised for relief of this pain, but it has proved disappointing in most instances. In addition to tenderness of the styloid process, tenderness appears along the entire path of the stylohyoid ligaments and the lesser cornu of the hyoid bone.

This type of pain often can be relieved by use of vasodilators, but it seems to yield more readily to penetrating heat, followed by deep massage.

### THE TEMPOROMANDIBULAR SYNDROME

Pain referred deep into the ear also is found frequently in periarthritis of the temporomandibular joint. When patients complain of earache and present no evidence of inflammation of the ear drum or external auditory canal, the temporomandibular joint on the same side should be palpated. Often it will be exquisitely tender. This pain appears to be due to fibrositis and, in contrast to myalgia and vasodilating pain, much relief can be obtained by use of salicylates. Occasionally some improvement in this condition can be obtained when the dentist opens a "closed bite," but more often disappointment is the result of extensive dental reconstruction. Roentgen therapy sometimes helps as does deep heat.

### EAR PAIN FROM IMPACTED MOLARS

In the adolescent and young adult, pain referred to the ear often is produced by an impacted third molar, usually in the upper jaw. If no other cause of pain in the ear can be found, this possibility should be considered and the patient referred to a competent dentist.

### MALIGNANT DISEASE OF THE PHARYNGEAL RECESS

Severe pain referred to the region of the ear and temporal region may be produced by a so-called transitional cell epithelioma or lymphocpithelioma in the pharyngeal recess or fossa of Rosenmüller. A malignant lesion in this region may persist for some months before any change becomes visible during posterior rhinoscopy. Frequently one of the early signs of this condition is serous otitis media on the involved side with loss of hearing and a stuffy feeling in the ear.

### EPIDURAL ABSCESS

Although less common in this age of antibiotics, the symptom of night pain again is assuming a little more prominence as resistant strains of organisms appear and ineffective use is made of antibiotic therapy. Mastoiditis evolving without pain or fever, the so-called masked mastoiditis, is seen occasionally. The initial symptoms in the ear may have been completely absent, but one to three months later the patient notes onset of unilateral head pain which wakes him after two or three hours of sleep or arouses him early in the morning. This condition is produced when an infection breaks through the bony walls of the mastoid process and an epidural abscess is produced. The exact mechanism by which such night pain is produced is not clear, because the only intracranial structures that are sensitive to pain, according to Wolff, 19 are the larger intracranial arteries and venous sinuses. It has been suggested that swelling of the intracranial contents takes place during sleep. This may cause traction on these vessels, and pain is produced if they are irritated by the presence of dural inflammation. In any event, the presence of severe night pain should cause the physician to inquire for an earache seemingly cured by use of antibiotics or sulfonamides one to two months previously. Roentgenograms of the mastoid region reveal definite evidence of destruction. Increased intracranial pressure with a choked disk on the involved side, occasionally on both sides, may be present.

### SUMMARY

The purpose of this review is to draw attention to the subject of somatic pain in the head in some of its more confusing aspects as viewed from the standpoint of the rhinologist, otologist, and laryngologist. Many of these pains are relieved readily if their cause is recognized. In most instances, they yield to relatively simple measures of treatment.

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### Editorial

All inquiries and manuscripts for the Section on Pain should be sent to Dr. John S. Lundy, 102 Second Avenue S.W., Rochester, Minnesota, or to the Editorial Department, The Journal-Lancet, 84 South Tenth Street, Minneapolis 3, Minnesota.

### RETROSPECT AND PROSPECT

T HAS BEEN almost two years since an attempt was made to produce a special issue of THE JOURNAL-LANCET devoted primarily to the subject of pain. In that issue of February 1952, the following papers appeared: "Pain as a Psychiatric Problem," by Lawrence C. Kolb; "The Analgesic Effect of Roentgen Rays," by Eugene T. Leddy; "Thoracic Pain in Cardiovascular Disease," by Thomas J. Dry; "Pelvic Pain From the Point of View of a Gynecologist," by Edward A. Banner; "Pain-relieving Drugs," by Ernest M. Hammes, Ir.; "Relief of Pain in Surgical Operations and in Obstetrics," by Ralph T. Knight; "Diagnostic and Therapeutic Nerve Blocks," by John W. Pender and John S. Lundy; "Painful Conditions of the Upper Extremity," by Collin S. MacCarty; "Histaminic Cephalgia," by Bayard T. Horton and "Monographs on Pain" by Thomas E. Keys. Since that time a total of 18 papers by 21 authors has been published.

Space for a "Section on Pain" was arranged for in the November 1952 issue of The Journal-Lancet as an experiment. With the encouragement received from this issue, a "Section on Pain" was again published in February 1953. At that time it was decided that we would start with the July 1953 issue to publish a "Section on Pain" on a quarterly basis. Generally speaking, in each issue we planned to have two papers devoted to pain and distress, an editorial, a small group of abstracts of selected papers,

and provision for questions and answers, if such should be desired. Finally, we proposed to include one or more book reviews that would be of interest to those concerned with problems of pain.

This plan was carried out in the July and October 1953 issues. We shall now begin, with this current issue, plans for four issues of The Journal-Lancet in 1954 which will contain a "Section on Pain." The publisher has arranged that the "Section on Pain" will be so bound into the journal that each section on this subject can be removed; the four sections thus can be bound together for convenient reference.

It is hoped that offers of papers and of editorials will be forthcoming. A large percentage of a physician's patients come to him complaining of pain or distress, and a special section devoted to pain would seem to be an ideal place for the publication and emphasis of such information.

In the present issue there appear "Somatic Head Pain From the Standpoint of the Rhinologist, Otologist and Laryngologist," by Henry L. Williams and "Differential Diagnosis of Ocular Pain," by Hugo L. Bair. These papers are presented in an effort to effect further concentration of information about pain for physicians who are particularly interested in certain regions of the body. In the October 1953 issue a paper "Pain Patterns in the Diagnosis of Upper Abdominal Diseases," was requested from the author, Lucian A. Smith, because he had already contributed greatly to this field in his book, Peptic Ulcer. Pain Patterns, Diagnosis and Medical Treatment, written in collaboration with the late Andrew B. Rivers. A review of the Smith-Rivers book is published in the present issue. A paper entitled, "Treatment of Pain Due to Metastasis or Inoperable Malignant Processes," by Hendrik J. Svien and one entitled, "General Considerations on the Question of Pain," by Warren H. Ash, will appear in the April 1954 issue in the "Section on Pain.

JOHN S. LUNDY, M.D.

### Reviews of New Books

PEPTIC ULCER: PAIN PATTERNS, DIAGNOSIS AND MEDICAL TREATMENT, by Lucian A. Smith, Assistant Professor of Medicine, Mayo Foundation, Head of Section, Division of Medicine, Mayo Clinic, and the late Andrew B. Rivers, M.D., Associate Professor of Medicine, Mayo Foundation, Consultant, Division of Medicine, Mayo Clinic, 1953. New York: Appleton-Century-Crofts, Inc. 576 pages. Price \$12.50.

Appleton-Century-Crotts, Inc. 576 pages. Price \$12.50. The essential purpose of this book is to provide help in the accurate diagnosis and satisfactory medical management of peptic ulcer. In order to plan a successful course of treatment which will result in a healed ulcer, a precise diagnosis must be made. It is not only necessary to know where the ulcer is situated, but also to know accurately whether the ulcer is in any way complicated. This book is not aimed at emphasizing pain patterns in

general nor is it aimed at those who are especially concerned with pain problems, but it illustrates well how the specialist in any field must broaden his point of view and his field of knowledge. Anyone who plans to practice diagnostic and therapeutic nerve blocking must read this book in order to inform himself of certain pain patterns. He must know about these in order to decide whether he should attempt to relieve a patient's pain by nerve block. The book then serves more than its original purpose and has high appeal for most medical men.

The ancient history concerning this special subject is presented and pictures are printed of 12 of the outstanding contributors to the development of knowledge about peptic ulcer, and an extensive bibliography (45 references) follows this first chapter dealing with history. The second chapter is on the anatomy of abdomi-

nal pain and discusses in some detail the various pathways, such as vagus nerve, splanchnic nerves, visceral afferent nerves with diagrams to illustrate the pain paths, some of the important viscera of the abdomen, and the dermatomes at various levels. The nature of visceral pain and somatic pathways is considered. The application of pain problems to peptic ulcer and the differential diagnosis from pain in other viscera are discussed in detail and made clear by diagrams. Space is given to quadrant anatomy of the abdomen and sectional anatomy. The third chapter deals with peptic ulcer and pathologic anatomy and gross and microscopic sections, and the various types are illustrated thoroughly by photomicrographs, photographs, and roentgenograms.

The fourth chapter is on physiology. Dr. Richard R. Ferayorni wrote the part on gastric secretion and discusses in detail this and the pathologic physiology of gastric secretions in peptic ulcer. In the remainder of the chapter, which is the work of the authors of the book, motor function of the stomach and duodenum, its nervous control, and the physiology of pain are considered. Pictures of several more investigators on the subject are presented and the various syndromes of peptic ulcer are dealt with as well as sensations other than pain. An extensive bibliography, 118 references, ends the chapter. The fifth chapter is on etiology. Local tissue resistance and defense factors as well as various factors (systemic and constitutional) associated with peptic ulcer in man are presented. Comment on esophageal ulcer and 75 references follow.

Chapter 6 deals with the clinical history and physical examination; chapter 7 with laboratory aids in the diagnosis of peptic ulcer, except roentgenologic examination; and chapter 8, a short one, with esophageal ulcer. Chapter 9 concerns itself with gastric ulcer and with the complications that have been observed in connection with these lesions. The area of surface anatomy to which pain is referred is described and illustrated. Differential diagnosis of the various types of ulcer, of benign and malignant gastric ulcer is taken up as well as gastric syphilis, tuberculosis, disease of the gallbladder, migraine, and heart disease. Chapter 10 deals with symptoms and diagnosis of duodenal ulcer, the various types of duodenal ulcer and ways in which it may become com-

plicated by perforating to the pancreas. Again the surface areas of referred pain are discussed and illustrated. The various lesions of the duodenum that may occur and need to be differentiated are discussed. These include cancer, pancreatitis, and pancreatic syndromes as well as appendicitis, diseases of the colon, disease of the kidney, skeletal pain, hernia, and others.

Chapter 11 is concerned with ulcer associated with Meckel's diverticulum and chapter 12 with postoperative peptic ulcer, other postoperative complications, and reactivated or recurring peptic ulcer after operations on the stomach or duodenum. The associated pain patterns are described and illustrated. Chapter 13 deals with symptoms and diagnosis of gastrojejunal and gastroileal ulcer. The various pain patterns are described and illustrated and recommendations are made on differential diagnosis and treatment of conditions. Chapter 14 deals with hemorrhage and its systemic manifestations and differential diagnosis. Chapter 15 deals with obstruction in detail. Vitamins and acute perforating peptic ulcer are discussed in chapter 16. Subphrenic abscess is discussed in chapter 17. Chapter 18, by Dr. Herbert W. Schmidt, deals with the endoscopic evaluation of ulcerating lesions in the stomach. Chapter 19, by Dr. C. Allen Good, is on roentgenologic diagnosis and contains many illustrations and detailed discussion, from the standpoint of a roentgenologist, of practically all of the lesions that he has been called on to examine.

The remainder of the book is on treatment. Chapter 20 is concerned with the approach to the medical treatment of peptic ulcer, chapter 21 with treatment of gastric ulcer, chapter 22 with treatment of uncomplicated duodenal ulcer, and chapter 23 with treatment of intractable pain. Chapter 24 is on treatment of perforation of duodenal ulcer, chapter 25 on pyloric obstruction, and chapter 26 on treatment of hemorrhage. An appendix gives diets in considerable detail for the various ulcers.

The book is well indexed, printed on excellent paper, easily read, and of a convenient size. Practically all physicians in general practice and many of those in the various specialties should have this book and one would expect it to be available in every medical library.

John S. Lundy, M.D.

### Current Literature on Pain

FATAL PULMONARY EMBOLISM DURING RE-GIONAL NERVE ANESTHESIA. J. CUTHBERT OWENS, M.D., and ALICE J. SMITH, M.D. Angiology 4:23-32, 1953.

Pulmonary embolism is a possible complication in regional nerve anesthesia despite the paucity of such reports in the medical literature. When a patient expires during or immediately after regional nerve anesthesia, the possibility of pulmonary embolus should be considered. Fatalities occur more often in patients with arteriosclerotic heart disease, lowered blood volume, or anemia. Possibly manipulation of the extremity during regional nerve anesthesia precipitates the embolus.

Indications for regional nerve anesthesia are multiple. In paravertebral or lumbar sympathetic block, regional nerve anesthesia may be given for: (1) diagnosis, to determine the lability of arterioles in the peripheral vas-

cular disorders and in patients with hypertension; (2) therapy, for thrombophlebitis, ulcers of the lower extremity, vasospasm, neuritis, or other types of segmental pains; and (3) anesthesia, for surgical procedures in areas innervated by the various nerve segments accessible for this type of block.

Infection at or near the site of injection constitutes a definite contraindication for anesthesia of this type. Patients on anticoagulant therapy are not good candi-

dates for paravertebral sympathetic block.

Spinal anesthesia is used either as a continuous or temporary anesthetic agent for operative or therapeutic procedures. The presence of any of the following factors dictates the election of spinal anesthesia: (1) where minimal metabolic derangement is essential as in diabetes mellitus, renal, or hepatic disease; (2) where lung pathology is present and any pulmonary irritation may

present postoperative complications; (3) when maximal relaxation is essential; (4) when a contracted bowel is required; and (5) when paravertebral block is contraindicated or fails to relieve vasospasm of the lower ex-

Subarachnoid anesthesia is contraindicated in cardiovascular diseases such as hypertension, myocardial disease, cardiac decompensation, and history of coronary disease. Spinal anesthesia should not be administered to hypotensive patients or to those in shock. Central nervous system anomalies, gastrointestinal tract perforation, septicemia or local infection, and anemia or disturbances in blood volume are other conditions which interdict spinal anesthesia. Elderly patients with questionable eardiovascular disease should not be given spinal anesthesia.

Epidural anesthetic indications are practically the same as for spinal anesthesia. Since the injected analgesic solution does not enter the dura or contact the unprotected nerve roots and cord, the effect of the anesthetic solution is limited below the medullary center with maximum sensory loss and minimum motor paresis. Fewer neurologic sequelae, minimal intercostal paralysis, and absence of complete respiratory paralysis constitute the major advantages of this technic.

Continuous epidural analgesia is excellent for sympathetic paralysis and may be almost as complete as with spinal anesthesia. Perhaps the most common indication for epidural anesthesia occurs when motor paralysis, especially intercostal, is undesirable, and the presence of subaraehnoid pathology renders spinal anesthesia inadvisable.

Epidural, high spinal, and splanchnic sympathetic blocks are occasionally used in lower nephron nephrosis. Contraindications are generally the same as for spinal anesthesia.

Caudal anesthesia is used in urologic, rectal, or perineal operations and in obstetrics. It is utilized therapeutically for relief of acute sciatic pain and to relieve vasospasm in peripheral vascular disorders. Contraindications are the presence of local infections and a distortion of bony landmarks.

PAIN AS A DIAGNOSTIC AID IN THE TREATMENT ABERRATIONS OF THE FACE, MOUTH, JAWS, TEETH AND SINUSES. HERMAN AUSUBEL, D.D.S. Dental Items of Interest 74:997-1006, 1952.

The most sensitive area of the human body is that supplied by the trigeminal nerve. Nature particularly endows this region with a merciful warning method when danger lurks. This warning is pain.

Physiologically pain is an intense stimulus applied on terminal nerve receptors which are conveyed to the sensorium of the brain by afferent dendritic nerve tracts.

Pain is the result of stimulation from mechanical, chemical, thermal, or bacterial origin. However, pain is in direct ratio to the intensity of pressure applied on the nerve structure and bears no relation to its relative danger to the organism. Thus, a mere dental pulpitis may cause one to scream with pain, while trachoma which blinds and carcinoma which kills may be painless.

The pain mechanism in different individuals and races differs significantly. Some individuals submit to toothgrinding or bone-chiseling procedures with little display of pain, while others experience excruciating pain under the same circumstances. Our present generation has developed more sensitive nervous mechanisms than their

The Thoma classification of pain is as follows: (1) drawing, lancinating pain, (2) pressure or tension, (3) burning, boring, or throbbing, (4) superficial, penetrating, or deep-seated, (5) constant, intermittent, or paroxysmal, (6) severe by night or day.

Certain dental conditions produce a characteristic type of pain, Patients with odontalgia complain of a pain caused by inhaling cold air, sweet and sour foods, and change in temperature from hot and cold foods.

Pulpitis produces a severe, throbbing, lancinating pain due to pressure of the engorged blood vessels on the pulpal nerve fibers against the unyielding tooth walls. Relief of pressure brings relief of pain. The relief of pain by cold and intensification of pain by heat is pathognomonic of a dying pulp.

Pericementitis, due to trauma or pulp involvement, is easily diagnosed because the tooth feels elongated and

painful to pressure.

Alveolar osteitis or dry socket is a surface bone inflammation resulting in necrosis due to the peculiar anatomic structure of the bone lodging in the tooth. Pain in these cases is the constant and low-grade type. The effect is eumulative and devitalizes the patient.

PAIN AS A DIAGNOSTIC AID IN THE TREATMENT OF ABERRATIONS OF THE FACE, MOUTH, JAWS, TEETH AND SINUSES. HERMAN AUSUBEL, D.D.S. Dental Items of Interest 75:71-79, 1953.

Pain may be the cardinal sign pointing to the diagnosis of such diverse clinical entities as dentoalveolar abscesses,

mumps, or salivary gland or duct lithiasis. In dentoalveolar abscesses, dental pulp putrefaction products enter the periapical area via the periapical foramen causing a periodontitis and a subjective sensation of an elongated tooth painful to pressure. Pain ultimately becomes extremely severe due to the pressure of pus against the unyielding bony walls. When the bone is broken through, pain subsides. Inflammatory symptoms of heat, swelling, redness, lymphadenopathy, and sometimes trismus follow the spread of infectious material to adjacent soft tissues.

History, percussion pain, mobility of the tooth, and a vitality test readily give the diagnosis despite a negative radiogram in early acute dentoalveolar conditions. Acute cases often show no bone changes, but the periodontal membrane may appear thickened.

Waiting for the end of an acute attack, tiding over an attack with antibiotics, or opening the pulp chamber in the hope of instituting drainage are harmful practices.

In dentoalveolar abscesses, nitrous oxide anesthesia is safest, except in coronary or hypertensive patients when ethyl chloride spray is used. Infiltration or block anesthesia is contraindicated because infection is apt to spread. Coronary patients are premedicated with 1/100 gr. of nitroglycerin sublingually and excitable patients receive 1.5 gr. of Nembutal one half hour preoperatively. Rheumatic heart patients are premedicated with 60 to 77 gr. of sulfathiazole or sulfadiazine for two days, or 300,000 units of penicillin a few hours preoperatively.

In normal extraction cases requiring no digging or chiseling into the bone, the infected tooth is extracted and a dressing inserted. When periapical fluctuation is present on any surface of the jaws, an incision is made simultaneously, the tissues are expanded with the periosteal elevator for drainage. Dressing is then inserted. Complicated cases involving trauma, anterior teeth, concomitant cysts, or trismus require technical modifications

of this procedure.

Acute alveolar abscesses are frequently diagnosed as mumps. In mumps, pain is intensified by jaw movements and stimulation of salivary flow by acid food. In dentoalveolar abscesses, pain is present whether the jaw is at rest or not and is not affected by ingestion of acid food. In 70 per cent of patients with mumps, the swelling is bilateral, one side usually preceding the other by some days. Alveolar abscesses present more pronounced symptoms than mumps. There is no trismus, redness, or suppuration in mumps. A dental history of past symptoms might give a clue to diagnosis.

Śwelling and pain in the cheek or under the jaw which is produced at the sight of food or while eating, and disappears subsequently, should alert the examiner to salivary gland or duct calculi. Chronic lithiasis results in swelling and suppuration of Wharton's or Stensen's ducts. Swelling is duc to salivary retention. Pain results from pressure. Calculi in the parotid gland or duct are rare. Most calculi can be removed intraorally. The calculi appear elongated like a date pit when lodged in the ducts and round when lodged in the gland. When anchored in Wharton's duct or in the sublingual gland they are readily removed intraorally. Glands return to normal when the calculus is removed.

PAIN AS A DIAGNOSTIC AID IN THE TREATMENT OF ABERRATIONS OF THE FACE, MOUTH, JAWS, TEETH AND SINUSES. HERMAN AUSUBEL, D.D.S. Dental Items of Interest 75:124-147, 1953.

Bleeding gums do not per se mean Vincent's infection. Scorbutic, leukemic, and diabetic stomatitis also produce gingival bleeding. Gum bleeding is common in children after serious illnesses and in women during pregnancy

or menstruation.

Vincent's angina is a characteristic disease associated with definite pathognomonic symptoms. These signs are sudden onset, excessive salivation, gingival ulceration and bleeding, fetid odor, readily detachable grayish membrane, slight temperature, and lymphadenopathy. Localized lesions of leukemia are differentiated by their refractoriness to Vincent's treatment and the absence of a bad odor. Surgery and general anesthesia are contraindicated in Vincent's infection.

Ludwig's angina is a virulent, diffuse infection of the floor of the mouth in which all cellular layers become fused into one board-like mass, interfering with respiration and deglutition. Hospitalization is necessary since intubation or trachcotomy is sometimes essential to maintain an airway. This infection is often fatal. No specific

treatment is known.

Osteomyelitis of the jaws is generally of odontogenic origin, often from an alveolar abscess, impaction, fracture, injection into an infected area, or curettement in an acute condition. Osteomyelitis cases are readily recognized clinically, although from seven to ten days may be required to make a radiologic diagnosis. Sudden onset, severe pain, high temperature, foul breath, periostitis involving a large area, loosening of several good teeth, and pallor of the patient aid the diagnosis.

Abnormal relationship of the condylar head of the mandible with the glenoid fossa sometimes produces glossopyrosis, pain in the temporomandibular joint, and tinnitus. When joint ligaments have been stretched unduly by frequent subluxation of the joint, these conditions can occur.

If proper surgical technics are used little or no postoperative pain occurs. The following are the main causes of postoperative pain:

1. Trauma produced by use of a blunt, heavy needle in anesthesia. A sharp 25-gauge needle should be used.

2. Poor bleeding or clotting. These cases should be dressed after surgery.

3. Mouth irrigation after surgery. Irrigation is contraindicated for several hours postoperatively.

4. Mutilation of mucosa or crushing of bone.

- 5. Foreign bodies such as pieces of filling or caseous pieces of tooth in sockets.
  - 6. Preexisting infection prior to surgery.

7. Residual infection.

- 8. Separating, crushing, or squeezing the alveoli during extraction, as in cases of divergent, excementosed, or curved roots.
- 9. Infected, unhygienic mouths, and low resistance to infection.
- 10. Sharp, thin, bony septa in multiple extractions or in molars. Rongeuring prevents this complication.

RELIEF OF PAIN IN TRIGEMINAL NEURALGIA BY CRYSTALLINE VITAMIN B<sub>12</sub>. WILLIAM S. FIELDS, M.D., and HEBBEL E. HOFF, M.D. Neurology 2:131-139, 1952.

Intramuscular injection of crystalline vitamin  $B_{12}$  in amounts far above the natural requirement is apparently the best treatment for tic douloureux.

Rapid total remission was obtained in 9 cases without previous surgery. Pain was relieved completely but at a slower pace in 4 patients who had undergone nerve section or repeated alcohol nerve block.

Doses of 1 mg, are given daily for periods of ten days or more, although symptoms may disappear with 2 or 3 injections weekly, in courses of four to eight weeks.

As a rule, distress is eliminated in two stages, first, paroxysmal pain, leaving a less severe burning sensation that also subsides in time. The typical frozen-faced individuals thaw and begin to talk and laugh without fear of precipitating an attack.

Remissions seem to continue indefinitely. No recurrence has been noted in eleven months since the last

injection of the first person treated.

The value of  $B_{12}$  in trigeminal neuralgia and peripheral nervous disorders from other factors, such as pernicious anemia and diabetes, implies a common etiology.

MECHANISM OF PAIN IN PEPTIC ULCER. JULIAN M. RUFFIN, M.D., GEORGE J. BAYLIN, M.D., CLARENCE W. LEGERTON, JR., M.D., and E. CLINTON TEXTER, JR., M.D. Gastroenterology 23:252-269, 1953.

Pain as a symptom of peptic ulcr has been attributed to several sources. Chemical irritation by hydrochloric acid of pain fibers in the ulcer has been suggested as a possible source. Others feel that pain is due to muscular activity of the stomach and duodenum. A third theoretical explanation indicates that this pain results from reflex disturbances of the motor mechanism of the stomach and duodenal cap, initiated by sensory nerves in the base of the ulcer by acid chyme.

Since hydrochloric acid and muscular motility are

variables, it was reasoned that if one factor was rendered constant, the influence of the other on pain could be determined. With this in mind, 100 studies were made on 88 active ulcer patients, all of whom complained of typical pain within the preceding twenty-four to fortyeight hours. The acid level in these patients was rendered relatively constant at a high level, so that the relationship between gastric motility and ulcer pain could be determined. The high acid level was attained in these patients by instillation of 200 cc. of 0.1 N HCl (pH 1). In 66 cases barium sulfate was added to the hydrochloric acid for fluoroscopic visualization. Development of typical ulcer pain, or the continuation or accentuation of spontaneous pain, after introduction of acid into the stomach constituted a positive test. A test was considered negative if no pain was produced in thirty to sixty minutes, or if spontaneous pain ceased within a few minutes after administration of the acid.

The highest percentage of positive tests occurred in cases having a lesser curvature or channel ulcer. Patients with prepyloric, duodenal, or marginal ulcers had the same degree of positive tests. Despite these artificially-produced high acid values, only 37 of the 100 tests were positive. From this observation alone, the concept that hydrochloric acid per se is the cause of ulcer pain is

questionable.

These results indicate the reverse. Ulcer pain in the uncomplicated case is invariably associated with abnormal motility and ceases when motor function returns to normal. This abnormality consists of incoordinated activity of the antral evacuation mechanism with or with-

out localized spasm.

Conversely, the patients with negative tests on whom detailed fluoroscopic observations were carried out show none of these abnormalities. In the majority there was normal motility with prompt evacuation. The remainder had quiet inactive stomachs with a patent pylorus, and gastric emptying proceeded normally when the patient was placed in the recumbent right anterior oblique position.

Banthine was given to 24 patients in this series and SKF-1637 to 2 patients with prompt relief of pain occurring in 25 cases. This relief coincided exactly with cessation of abnormal motility and relaxation of the

stomach.

Abnormal motility is then the fundamental mechanism through which ulcer pain is produced. The production and perception of ulcer pain involves four factors: (1) a stimulus, possibly HCl, (2) an intact motor nerve supply to the stomach and duodenum, (3) altered gastroduodenal motility, and (4) an uninterrupted sensory pathway to the cerebral cortex.

MESENCEPHALOTOMY IN TREATMENT OF "INTRACTABLE" FACIAL PAIN. E. A. SPIEGEL, M.D., and H. T. Wycis, M.D. Arch. Neurol. & Psychiat. 69: 1-13, 1953.

Refractory facial pain may be relieved by electrolytic lesions of specific pain-conducting pathways in the midbrain or thalamus. Often facial pain persists not only after the usual conservative methods of treatment but also after such neurosurgical procedures as retrogasserian rhizotomy or prefrontal lobotomy.

This challenging problem was met by placing electrolytic lesions in the pain-conducting pathways at the mesencephalic level by means of a stereoencephalotome.

This procedure is termed mesencephalotomy. In some cases, this technic was combined with lesions of the dorsomedial nuclei of the thalamus in order to reduce emotional reactivity to remaining pain sensation due to accessory pain-conducting fibers.

Anatomically, the ascending pain fiber bundles are interrupted by an oblique puncture which is inclined backwards 34° to the interaural plane. This puncture lies in a plane through the posterior commissure. Possibility of damage to the auditory system is minimized since the auditory system occupies a larger area here than in the brachium of the inferior colliculus, where a small lesion may easily interrupt all cochlear impulses. When such a puncture is made, the variability of the inclination of the brain in the sagittal direction must be borne in mind.

Efforts are made to reduce injury of areas above the electrolytic zone to a minimum by producing the lesions through a single puncture instead of a row of several punctures. Introducing the stylet electrode at the approximate center of the area to be destroyed accomplishes this. The stylet serves as the anode for the direct current. The stylet is introduced into the tissue in a medial as well as lateral direction, so that electrolysis on either side of the puncture canal can be performed.

Six cases of intractable facial pain were treated by this technie. In three cases in which the apparent diagnosis was tic douloureux, retrogasserian rhizotomy failed to relieve pain. In the fourth case thalamic pain has been refractory to cortical operations. The fifth case had pain of pontine origin which persisted after contralateral prefrontal lobotomy. In the first three cases contralateral or bilateral lesions of the dorsomedial nuclei were added to the mesencephalotomy to reduce the emotional reactions accompanying a possible remaining pain perception. In the cases with organic thalamic and pontine lesions, mesencephalotomy alone was performed.

Freedom of pain for the duration of observation, which was four and one-half years, was noted in one case and for nine months in another case. In one case a transitory relapse occurred after over three years. In two cases the postoperative period was too short to permit a definite appraisal. One case of thalamic pain was relieved for only four and one-half months, probably due to incomplete interruption of the pain-conducting systems. Thus, the important role played by afferent impulses in the pathogenesis of thalamic pain is illustrated.

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PAIN—CHEMOTHERAPEUTIC AND SURGICAL APPROACH. ROLAND M. KLEMME, M.D. J. Internat. Coll. Surgeons 17:439-444, 1952.

Benefits of chemotherapy are achieved either by interrupting the mechanism responsible for pain or by raising the threshold of pain perception. Atropine, for example, may relieve pain of smooth muscle spasm by relieving the spasm, whereas analgesics control reaction to pain by modifying sensory perceptions.

Chemotherapy, however, is indicated only for patients with conditions producing pain of relatively short duration. Surgical intervention, to obliterate or interrupt the

painful stimuli, should be used for patients with pain of long duration. By this method not only is pain relieved, but drug addiction is obviated.

Extirpation of the painful part, as in peptic ulcer, is one method of surgical pain relief. Section of the peripheral nerve transmitting the painful impulses is effective but should be discouraged as muscular motor function is also affected.

Section of sensory nerve roots is extremely satisfactory in intractable pain of face and neck due to neuralgias and carcinomas. Injection or removal of part or all of the sympathetic chain often relieves pain emanating from the abdominal viscera.

In the presence of widespread pain, selective section of central nervous system tracts gives gratifying results, as does section of the spinothalamic tract in the spinal cord or the medulla, or removal of the postcentral gyrus. Lobotomy and topectomy distort interpretation of pain, but effect on the patient's mentality makes such procedures questionable.

TREATMENT OF POSTSPINAL HEADACHE WITH BUCCAL TABLETS OF DESOXYCORTICOSTER-ONE ACETATE. ROBERT I. PFEFFER, M.D. Am. J. Obst. and Gynec. 65:21-23, 1953.

Headache after saddle block anesthesia often responds to treatment with desoxycorticosterone acetate. Among 35 obstetrical patients, complete relief was observed in 30 and benefit in 2 cases after administration of a 2-mg. buccal tablet of the drug every four to six hours. The effect was evident within one hour and sometimes continued for twenty-four hours. The steroid was given for one to four days.

TRICHLORETHYLENE ANALGESIA IN LABOUR. Editorial. Brit. M. J. 4807:443-44, 1953.

The advisability of allowing midwives to administer trichlorethylene (Trilene) during labor is under consideration by a British committee of obstetricians, anesthetists, midwives, and research workers. Analgesic effects of this compound, discovered during World War I when German workers inhaled vapors of the liquid being used as a degreasing agent, have been extensively studied. Any device approved for administration of this drug by midwives should deliver effective, safe, and unvarying concentrations of the vapor. Cumulative effects of the drug, if given over a long period, demand that judgment and skill be exercised in its use. Severity of pain, a purely subjective finding, cannot be used as the sole basis for beginning the administration of trichlorethylene.

THE RELIEF OF PAIN IN CHILDBIRTH. F. N. REY-NOLDS, F.R.C.S. Ed., F.R.C.O.G. J. Irish Med. Assn. 31:357-360, 1952.

Demerol is the most satisfactory analgesic which has yet been introduced for obstetrical use. The drug is particularly suitable for the first stage of labor and the early part of the second stage. The main risk involved is its use late in labor with a primipara or anytime after labor is established in a multipara. An unattended patient might deliver precipitously and hemorrhage profusely. This risk can be obviated if such patients are never left un-attended after Demerol has been administered.

On the other hand, if a full dose of 100 mg, is given as a sedative before labor is properly established, Demerol may cause labor to halt for many hours.

Demerol should be used alone and not in conjunction with other drugs. When used in combination, the drug may cause the baby to cry lustily at birth, but after ten or fifteen minutes show signs of distress, become pale, and toneless with a gradually failing heartbeat. These conditions never occur when the drug is used alone.

Nitrous oxide and air provide one means of carrying the patient through the interval after the effects of Demerol have worn off and before more complete anesthesia is indicated. This can be administered by any of several machines arranged to give a fixed proportion of gas and air, generally 45 per cent gas to 55 per cent air. A special attachment may be added to the machine whereby the patient receives a few breaths of pure nitrous oxide each time she applies the mask.

Trilene is recommended as the ideal inhalant when the effects of Demerol have worn off. A sufficient anesthetic for delivery, although not producing a pronounced degree of relaxation, this gas has a great advantage in that it can be self-administered with a very simple inhaler. Other advantages include easy portability, low cost, and relative safety.

Trilene is a gas of low volatility and is noninflammable. The gas is comparatively nontoxic even if given over a period of several hours. In its effect, Trilene is the equal of nitrous oxide and air, if not superior.

Neither nitrous oxide nor Trilene should be expected

to take the place of actual anesthesia.

Chloral hydrate and bromide, 30 gr. of each, are valuable in very early stages when the patient suffers from a series of irritating, niggling pains which produce sleeplessness but no advance. These drugs are rarely of value after true labor is established.

Morphine and scopolamine is the combination par excellence for patients with cardiac disease, undergoing trial labor, or in whom a long first stage is anticipated. Both drugs, however, may be dangerous to the fetus and great care must be taken in their use.

Caudal anesthesia, consisting of the introduction of 1 per cent procaine or 1.5 per cent Metycaine into the epidural space via the sacral hiatus, requires good technic, but is useful in cardiac patients or in those undergoing trial labor.

A PROLONGED LOCAL ANESTHETIC IN CON-TROL OF POST-TONSILLECTOMY PAIN. MORRIS DAVIDSON, M.D., ROBERT G. BOLES, M.D., and SAN-FORD C. SNYDERMAN, M.D. Ann. Otol. Rhin. & Laryng. 61:1046-1047, 1952,

A solution of procaine and butyl aminobenzoate in a water-miscible, nonoily base (Efocaine) does not consistently relieve post-tonsillectomy pain. When 1.5 cc. of the preparation was injected along the anterior and posterior pillars of one side after removal of the tonsils by the dissection and snare method, 4 of 19 adult patients stated that the injected side felt better, 5 had equal pain on both sides, and 10 said that the injected side hurt more. Among 8 children, 2 had no pain, 3 had equal pain on both sides, 1 thought the injected side felt better, and 2 had greater discomfort on the injected side.

## American College Health Association News . . .

Thirty-three delegates attended the annual meeting of the North Central Section of the American College Health Association held October 16 and 17 at the University of North Dakota. Special emphasis was placed on problems of the smaller college health departments, and good group discussions followed the presentation of papers. The program included:

Problems of Athletes and Physical Education with relation to Student Health Service. "Study of Intercollegiate Boxing Injuries at the University of Wisconsin"—Dr. J. W. Brown, professor of preventive medicine, director of student health, University of Wisconsin. Discussion of Dr. Brown's report and Problems of Physical Education. Leader: Mr. Leonard Marti, director, department of men's physical education, University of North Dakota. Resource: Mr. John Quaday, physical education department, University of North Dakota; Mr. William Richter, coach, State Teachers College, Valley City, North Dakota.

Group Insurance for College Students. Mr. Peter A. Danielson, Special Risks Division, Continental Casualty Co., Chicago.

Current Problems of Student Health Services including Special Reports by Nursing Committee. Moderator: Dr. Lois Boulware, University of Iowa, Iowa City. Participants: Dr. R. C. Painter, director student health department, University of North Dakota; Miss Maida Hewitt, R.N., North Dakota Agricultural College; Miss Lilli Astrup, R.N., State Teachers College, St. Cloud, Minnesota; Miss Alice Matz, R.N., State College, Eau Claire, Wisconsin. Resource: Dr. Theodore Harwood, dean, school of medicine, University of North Dakota; Dr. C. A. Sevrinson, dean of student affairs, State Agricultural College, Fargo, North Dakota; Mrs. Charlottee Grue, R.N., Luther College, Decorah, Iowa.

Health Education in Colleges. Report: Brother H. Charles, F.S.C., director student health service, St. Mary's College, Winona, Minnesota. "Factors that Contribute to Adequate Health Education for Students in Institutions of Higher Education"—Dr. Garold D. Hostine, dean of the school of education, University of North Dakota.

Productiveness of the Chest X-ray Survey of Students, Faculty, and Employees at the University of Minnesota. Dr. Phillip D. Kernan, student health department, University of Minnesota.

Officers elected for the next year are as follows: president, Dr. Lois Boulware, University of Iowa; vice-president, Dr. Donald Peterson, St. Olaf College; secretary-treasurer, Anne Redman, Iowa State College. The 1954 meeting will be held at Luther College.

The officers of the Ohio Section for the academic year 1953-54 are: president, Max L. Durfee, M.D.; vice-president, William T. Palchanis, M.D.; secretary-treasurer, Eleonara L. Schmidt, M.D.

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Miss Mary Elizabeth Lewis, R.N., M.A., director of the student health service of George Peabody College for Teachers, very thoughtfully sent us her copy of the thesis she submitted in partial fulfillment of the requirements for the degree of Master of Arts in the department of education of the graduate school of education, George Peabody College for Teachers. The title of the thesis is "A Comparative Survey of Health Services in Five Teachers Colleges," the colleges surveyed being George Peabody College, Western Kentucky State, Tennessee Polytechnic Institute, East Tennessee State, and Florence State. Miss Lewis received her Master's degree on August 19, 1953.

Leona B. Yeager, M.D., Northwestern University, was the American College Health Association delegate to the fourth National Conference of Physicians in School. She reports that the conference was divided into subject groups which discussed assigned problems. Of interest to college health personnel was a plea for better selective processes in universities and colleges which train teachers. It was suggested that an organization such as the National Education Association undertake setting up a committee whose aim would be to establish such a criteria. It was recommended that medical societies should have active health committees to coordinate the efforts of the profession in the promotion of the health of the school child. The functions of such a committee, it was pointed out, are: (1) to encourage sanction by the medical profession of a sound school health program; (2) to assist in establishing sound policies and procedures in the health program; and (3) to develop reciprocal relations with the dental society, school system, health department, parent groups, and other organizations. It was likewise stressed that such a committee does not relieve the individual physician of responsibility for active participation in the school health affairs of his community. Mental health aspects of teaching in the classroom were similarly explored. The delegates were enthusiastic and worked continuously to arrive at concrete suggestions and recommendations.

The University of Florida student health department reports that the month of October was normal from the standpoint of disease incidence. As usual, upper respiratory infections accounted for the largest number of cases treated, with a total of 1,843 clinic visits. Next in order were diseases of the integumentary system, with 912 visits. There were 628 injuries. The infectious and contagious disease incidence was unusually low. The average number of cases seen daily, including Sundays and holidays, was 271.

A note from Dr. Louis S. Gerber informs us that he is with the Student Health Service of the University of New Mexico. Dr. Gerber previously spent two years in private practice.

In the June 1953 issue of the New York State Department of Health journal *Health News* there is an excellent article by Norman S. Moore on "Student Medicine . . . The Cornell Plan." This informative paper is well worth reading.

The Management of Bronchial Asthma, by Herbert G. J. Herx-Heimer, M.D., 1952. London: Butterworth and Co., Ltd., 107 pages, 16 illustrations. \$3.35.

This brief and informal discussion of the management of bronchial asthma emphasizes the necessity of critically evaluating therapy in each patient and offers helpful suggestions for accomplishing this evaluation. It is a practical book well worth reading for those who must manage patients with this chronic disease.

G. Hollifield, M.D.

The Anatomy of the Nervous System, by S. W. Ranson, revised by Sam L. Clark, 1953. Philadelphia: W. B. Saunders Co., 581 pages. \$8.50.

Since 1920 Ranson's Anatomy of the Nervous System has been the medical student's bible in neuroanatomy. The phenomenal success of this book attests to its clarity and usefulness. It has been translated into foreign languages and is used in its English text in many foreign countries.

The new ninth edition has a familiar look, though in a more pleasing format. The changes have been principally in the text and are in the nature of rewritings to conform to newer findings in the field. The book is marred by a few poorly executed figures. In particular, figure 41, a median sagittal section of the brain stem, is badly in need of replacement. This particular view, I have observed, is used more than any other single figure by the medical students and hence should be the most carefully drawn. Ranson's figure does not compare with comparable plates in the other texts. The same is true for figure 214 of the corpus striatum. This ancient pieture gives a distorted view of the relation of the amygdaloid nucleus to the rest of the basal ganglia. The Jaeobsohn nuclear figures should be relabelled as this series loses much of its usefulness because of illegible

leaders.

To "blend the account of the structure with function" (preface) is not an easy task in the present state of our knowledge of neurophysiology and a few rough places are certain to confuse the student. This is particularly true in the matter of synaptic function. A newly written part of the text states, "Although an impulse never crosses a synapse it is convenient to follow the



succession of impulses through a chain of neurons without mentioning the synaptic interruptions." No one could object to this. But how is the student to understand a following statement that, "there is reason to believe that the resistance interposed by a synapse may vary from moment to moment"? Resistance to what? The use of self-exciting neuron circuits to get over the long latency of reflex phenomena is probably a little overdone. However, comments on the complexity of the central fibers of the primary sensory neurons and its implications on reflexology are admirable, and the functional discussions are for the most part on a high plane.

The paper of Cooper and Sherrington (1940) demonstrating the origin of Gower's fasciculus in the ventral horn has seemingly posed difficult problems for textbook writers. Those of us who took pains to repeat the excellent experiments reported in that paper feel that it is time to pin the label "qualify" on such statements as "Gower's tract . . . It is said to consist of fibers which arise from the cells of the posterior gray column and intermediate gray matter of the same and opposite side." The treatment of the spinothalamic tracts is equally uncritical. This is in sharp contrast to the able treatment of the thalamus and of the fiber tracts through the subthalamic region. In addition, Dr. Clark is to be congratulated on a well chosen pathway through the controversial issue of the parcellation of the cerebral cortex. BERRY CAMPBELL, M.D.

Human Embryology, by Bradley M. Patten, 1953. New York: Blakiston Co., Inc., 798 pages, over 1400 illustrations. \$12.00.

Patten's textbook is designed for medical students and for other persons interested in the embryology of man. The second edition has three new features. First, 11 new illustrations of the superb Hertig-Rock embryos are reproduced: two-cell stage, free blastocyst, and implanting ovum. Second, 11 new figures are included in an expanded section on congenital anomalies of the cardiovascular system. Third, some 160 new references appear under the heading "Supplement to Bibliography, 1945-1952."

Viewed as a whole, this book makes a substantial contribution to the understanding of the elements of human embryology. Its text is unusually clear, easy to read and to understand. Most of its many illustrations are excellent. It is perhaps inevitable that inaccuracies should ereep into even so excellent a text as this.

For example, figure 305A cannot be expected to clarify diaphragmatic hernias, or even to depict normal development, because it perpetuates the erroneous notion that the pleuroperitoneal membranes develop into large segments of the diaphragm.

Figures 377 and 378 scarcely contribute to a full understanding of the embryology of indirect inguinal hernia since they show only one of those four "outpocketed" layers of the abdominal wall which constitute in both sexes the inguinal bursa and since they convey a common misconception of the gubernaeulum testis (cf. Wells and State: Surgery 22:502-508, 1947). Figures 3 and 262 and page 598 contribute to confusion in that the *ligamentum ovarii proprium* is designated "round"

ligament of ovary.' Figure 287 and page 481 give the erroneous impression that the proximal end of the dorsal pancreatic duct usually disappears and that in the adult there is always a hepatopancreatic duct (ampulla of Vater). Actually, in most adult cadavers the proximal end of the dorsal pancreatic duct (accessory duct of Santorini) opens into the duodenum via the minor papilla, a fact easily de-monstrable by dissection. A long hepatopancreatic duct (primitive ampulla) is present in the human embryo, but during fetal life it becomes cleft in much the same way as the cloaca is cleft into rectum and urogenital sinus (Schwegler and Boy-DEN: Anat. Rec. 67:441-467, 1937). Thus in 200 consecutive necropsies, Mann and Giordano found that the bile and pancreatic ducts opened separately on the major papilla in 31 per cent of specimens (MANN and Giordano: Arch. Surg. 6:1-30,

L. J. Wells

### North Dakota

PLANS are being formulated for the 1954 medical clerkship program for the sophomore class at the University of North Dakota medical school by Dr. Theodore H. Harwood, dean. The program, inaugurated last spring, was said to be a "distinct success." The purpose of the clerkship program is to provide actual clinical experience for medical students. Hospitals, clinics, and doctors in Grand Forks, Devils Lake, Dickinson, Fargo, Jamestown, Minot, Rugby, Williston, and Ellendale participated in the 1953 work. Other cities are to be added in 1954.

A HEALTH CENTER at Kulm, though completed about eight months ago at a cost of about \$40,000, is still without a doctor to put it into operation. Dr. H. A. Fandrich, who had much to do with planning the center, has left the community and is now practicing at Medina.

A NEW CLINIC was opened at Tioga on December 7. Construction of the \$40,000 project began in August. Finishing work on the modern, functional building is not yet complete. Interior decorating will be done in the spring on a western note in keeping with the prairie-style exterior. The clinic opened with a staff of 7, but it is expected another person will be added later.

New officers of the North Dakota Society of Obstetrics and Gynecology are: Dr. Frank DeCesare of Fargo, president; Dr. Carroll M. Lund of Williston, vice-president; and Dr. John S. Gillam of Fargo, secretary-treasurer. The 1953 fall meeting was held at Grand Forks. Attendance was approximately 70 per cent of the membership of the society.

Dr. Andre Fichtner, who arrived in this country in November, is an intern at St. Luke's Hospital in Fargo. The United States is the fourth country in which Dr. Fichtner, a native of Poland, has resided. He cannot establish a private practice until he becomes a United States citizen. He is already looking forward to his "first papers."

### Minnesota

The Minnesota Academy of Occupational Medicine and Surgery was organized in Minneapolis in October. The following officers were elected: Dr. Wilford E. Park, president; Dr. John F. Shronts, vice-president; Dr. Leslie W. Foker, secretary; Dr. James R. Rox, treasurer; and Dr. Herman E. Drill, recorder. Executive board members are Dr. Edwin G. Benjamin and Dr. Leonard S. Arling.

VOLUNTEER workers met December 5 at the University of Minnesota to discuss plans for the Heart Fund of the Minnesota Heart Association. The annual fund campaign will take place in February and the quota is \$210,000.

DR. HENRY ULRICH, who helped found the Hennepin County Tuberculosis Association fifty years ago, was honored at an anniversary luncheon of the group. Dr. Ulrich was presented with a plaque in the form of the well-known tuberculosis emblen. He is a former president of the association.

Three Minncapolis doctors are to hold top positions at the new Veterans Research Hospital in Chicago. Dr. Richard V. Ebert became the hospital's chief of medicine in September. Dr. Ben I. Heller will be chief of the new metabolic section. Dr. Craig Borden will be chief of the cardiovascular section. The new research hospital is one of the country's finest.

DR. Francisco Grande has been appointed associate professor in the laboratory of physiologic hygiene at the University of Minnesota. Dr. Grande will hold the post until June 15. He was professor of physiology and biochemistry at the Institute of Medical Research, Madrid, Spain.

Dr. Richard Anderson, a St. Paul psychiatrist, has been named associate professor to head the psychiatry service at Minneapolis General Hospital. In addition he has been appointed to set up a program for service, research, and teaching.

### South Dakota

Dr. W. H. Saxton has been elected the new president of St. John's Hospital medical staff at Huron. Dr. Paul Tschetter was elected vice president and Dr. R. A. Buchanan, the outgoing president, was elected secretary-treasurer.

DR. WAYNE SHAW has opened offices in the Canova Memorial Hospital building. At present the hospital is not in operation, but it is hoped it may be reopened in the near future. In the meantime, Dr. Shaw will maintain offices on the first floor of the building.

Dr. John B. Slingsby has joined the staff of the Dawley-Kegaries Clinic at Rapid City. A graduate of the University of Rochester, New York, he served for the past year as chief of residents at the University of Colorado.

. . . .

### $Deaths \dots$

Dr. James Marr, 52, superintendent of the State School for the Mentally Retarded at Grafton, North Dakota, died December 2. Dr. Marr was well known in the field of mental retardation research.

Dr. Lee W. Barry, 67, St. Paul, Minnesota, died December 3 at Fort Lauderdale, Florida. Dr. Barry, a specialist in obstetrics and gynecology, had been chief of the medical staff at St. Joseph's hospital and was on the teaching staff of the University of Minnesota.

Dr. Hugh J. Tunstead, 77, Minneapolis, Minnesota, died November 29. Dr. Tunstead was on the staff of Eitel Hospital.

Dr. Hillard H. Holm, 60, famous for his successful separation of Siamese twins at Glencoe, Minnesota in 1927, died November 19.

Dr. Robert Cyrus Farrish, 86, a physician at Sherburn, Minnesota for forty-eight years, died December 11.

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Surgical Technic, Surgical Anatomy & Clinical Surgery, Four Weeks, starting March 8.

Surgical Anatomy & Clinical Surgery, Two Weeks, start-

ing March 22.

Surgery of Colon & Rectum, One Week, starting March 1.

Fractures & Traumatic Surgery, Two Weeks, starting March 1.

General Surgery, Two Weeks, starting April 26.

Gallbladder Surgery, Ten Hours, starting in April 26.
Basic Principles in General Surgery, Two Weeks, starting March 29.

GYNECOLOGY—Intensive Course, Two Weeks, starting February 15. — Vaginal Approach to Pelvic Surgery, One Week, starting March 1.

OBSTETRICS - Intensive Course, Two Weeks, starting March 1.

MEDICINE—Electrocardiography & Heart Disease, Two Weeks, starting March 15.—Two-Week Intensive Course starting May 3.—Gastroscopy, Two Weeks, starting in March.

DIAGNOSTIC X-RAY—Two-Week Didactic & Clinical Course starting January 4, March 1.—Clinical Course every week by appointment.

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# Journal Lancet

SERVING THE MEDICAL PROFESSION OF MINNESOTA, NORTH DAKOTA, SOUTH DAKOTA AND MONTANA

# Congenital Lesions of the Urethra Bladder, Ureter, and Kidneys\*

NORVEL O. BRINK, M.D. Bismarck, North Dakota

A GREAT DEAL of attention has been rightly given in recent years to the early diagnosis and treatment of diseases such as cancer, poliomyelitis, and heart disease. Congenital lesions of the urinary tract comprise a category of diseases which are not well known, and which as a result are frequently diagnosed and treated after irreparable damage has been done. It is my desire to make a partial presentation of these congenital lesions so the general practitioner and general surgeon may review the subject.

Starting with the urethra, we have stricture of the external meatus, which is quite frequent and easily treated by ventral meatotomy or simple dilatation. Urethras of congenital narrow caliber are also occasionally encountered. Usually they cause little difficulty unless some transurethral manipulation is necessary, and with the newer, smaller cystoscopes, this difficulty has

been for the most part eliminated.

Hypospadias still presents a great problem, not in diagnosis, but in surgical correction. This may be minimal in type if only the meatus is involved, or the external urethral orifice may be in the very perineum with pronounced chordee associated. Stricture of the external meatus

NORVEL O. BRINK, a 1934 graduate of the University of Minnesota, is with the department of urology at the Quain and Ramstad Clinic, Bismarck, North Dakota. He is diplomate of the National Board of Urology and a fellow of the American College of Surgeons and the International College of Surgeons.

is frequently seen with hypospadias. Figure 1 shows a case of the perineal type of hypospadias. The associated bifid scrotum can also be noted. The patient could void only in a sitting position. This case was corrected in three stages: (1) the correction of the chordee, (2) the formation of a free, full thickness tubular skin graft, and (3) the new and old urethras were joined. This patient has normal erections, intercourse, ejaculations, and voiding at the age of 21, eight years after surgery. At the present time I prefer a two-stage operation. The first stage consists of correcting the chordee and the formation of a tubular pedicle skin flap from the scrotum. The second stage consists of using this previously prepared tubular skin flap in the formation of the new urethra. Many men are content to let the new urethra stop at the corona. Personally, I prefer to bring the new urethra out to the tip of the glans penis where it normally belongs. Admittedly this latter procedure is more difficult. This disease should be corrected before boys start school in order to minimize the mental trauma incident to the disease. The incidence of this disease is about 1 to 1,000 births, and it represents a failure of closure of the urethral folds which closure starts posteriorly.

Extrophy of the bladder is represented by a case of an 8-month-old boy who had previously had a permanent transverse colostomy for ster-

<sup>\*</sup>Paper presented at the North Dakota State Medical Society Meeting, Minot, North Dakota.



Fig. 1. Perineal type of hypospadias. Note associated bifid scrotum

ilization of his bowel to prevent an ascending pyelonephritis and uremia. Figure 2 shows the lesion and the child. In figure 3, the pronounced separation of the pubic bones can be seen. Upper urinary tract seems fairly normal. The incidence of this disease has been variously estimated at from 1 to 5,000 or 1 to 50,000 births. It represents a failure of the somatopleure to unite anteriorly. Epispadias, and in the female, bicornate uterus are also frequently found. For this patient a cystosigmoidostomy was done and the lateral walls of the bladder freed and closed anteriorly. Thus, the newly closed bladder becomes a diverticulum of the sigmoid and the valve function of the intramural portion of each ureter is preserved. Later a repair of the epispadias will be made. Upon operation for an incarcerated left hernia, it was of interest to find the cecum and the appendix in the left inguinal hernial sac. The presence of one congenital anomaly should make us increasingly alert for other anomalies.

Congenital vesical neck obstruction may be neurogenic in type. Suprapubic pressure plus the use of Urecholine or similar drugs, suprapubic cystostomy, or transurethral resection of the internal urethral sphincter are useful for this condition. The mechanical type of congenital

vesical neck obstruction is represented by congenital urethral valves and median bars. Concerning the etiology, the following factors must be considered: (1) persistence of temporary folds near the verumontanum, (2) fusion of the colliculus with epithelium of the roof of the posterior urethra, and (3) abnormal development of the wolffian or mullerian ducts.

A boy who was 8 years of age in 1923 was found to have a distended bladder, and both

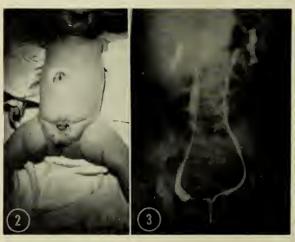


Fig. 2. Transverse colostomy in 8-month-old boy. Fig. 3. Shows separation of pubic bones in same infant.



Fig. 4. Pronounced dilatation of each pelvis and moderate dilatation of calyces.

kidneys and ureters were distended as well. A cannula was inserted in the bladder through a trochar and shortly thereafter a dePezzer catheter was inserted into the right hydronephrotic sac. In 1940, cystoscopy was done. A median bar and membranous urethral valve extending from both sides of the verumontanum anteriorly to the neck of the bladder were found. The valves were destroyed by fulguration and the prostatic urethra dilated. In 1931, the median bar was partially destroyed by fulguration and the urethra dilated. This improved voiding, so that very little discharge from the nephrostomy tube occurred. In 1938, the patient was voiding quite easily. Indigo carmine came down through both urethral meatuses in less than ten minutes. Blood urea was 22, blood pressure 140/90, and hemoglobin 80. In 1943, cystoscopy showed rather pronounced median bar formation again. This condition was completely removed by transurethral resection. In 1948, the patient was voiding well without residual urine. Pyuria was absent most of the time. Slight stricture of the left lower ureter was present, and a left ureteral calculus occasionally passed spontaneously or had to be removed transurethrally. While far from normal, we are happy with the result considering the original condition of this person. He remains well, has graduated from college, and works regularly as an engineer.

The next patient came to us because of bilateral cryptorchidism. He was found to have a blood urea of 150 mg. and a residual urine of 1,000 cc. Cystoscopy showed a pronounced spasm of the internal urethral sphincter. Figure 4 shows pronounced dilatation of each pelvis and moderate dilatation of the calyces on each side. This patient was treated with catheter drainage and forced fluids, and a little later

a transurethral resection of the internal sphineter was done. Postoperatively his blood urea came down to 40 and residual urine to 20 ec. A first stage Torek operation was done on the left and an orchiectomy was done on the right because of hypoplasia of the right testicle. The patient is working full time as a farmer and continuing to void normally six months later.

A 2-year-old girl seen in 1944 was found to have urine loaded with pus, and cystoscopy showed the bladder to be filled with a large soft mass. Ureteral orifices could not be seen. Previously she had elsewhere had incision and drainage through the right abdomen of a right pyonephrosis. Through a suprapubic cystotomy an excision of a tremendously large right urcterocele was performed. Figure 5 shows two pyelograms. The first, taken in 1944, shows pronounced caliectasis on the right and reduplication of the left kidney. In 1946, two years postoperatively, the pyelogram shows slightly less caliectasis of the right kidney. The pelvis is still not well visualized, and some ureterectasis and caliectasis can be seen on the left side. Dilata-

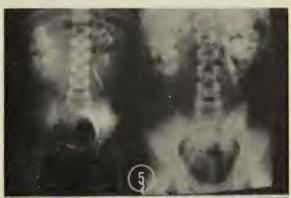




Fig. 5 (left). Pronounced caliectasis on the right and reduplication of left kidney, (Right) Two years postoperatively less caliectasis of right kidney. Pelvis still not well visualized. Some ureterectasis and caliectasis of right kidney. Fig. 6. Good function on each side.



Fig. 7. Normal right kidney. No kidney on left side.

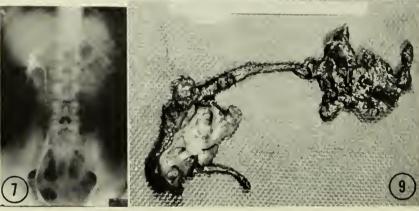


Fig. 8. Cystic seminal vesical, rudimentary ureter, and kidney in closed state. Fig. 9. Cystic seminal vesical, rudimentary ureter, and kidney in open state.

tion of the left lower ureter was easily carried out. A third pyelogram taken in 1953 (figure 6) shows good function in five minutes on each side. The left ureter is less dilated at this time. The outline of the right kidney and pelvis are slightly improved. Her blood pressure, blood urea, hemoglobin, and general condition are normal.

A 30-year-old man was seen in 1947 with a right ureterocele which extended into the prostatic urethra and bilateral reduplication of kidneys and ureters and multiple calculi in the right ureterocele. Some of these ureteroceles of large size, and particularly in females, have been seen presenting at the external urethral orifice. Many ureteroceles are missed at cystoscopy because too high intravesical pressure is used which causes the sac to collapse. Transurethral resection of the ureterocele and evacuation of the calculi were done in this case.

A 6-year-old boy was found to have pronounced dilatation of the left ureter and pelvis and no evidence of function on the right side. At cystoscopy no right ureteral orifice was seen. The left orifice could not be passed with a No. 4 French ureteral catheter. Exploration showed congenital absence of the right kidney and ureter, a one and a half inch dense stricture of the left lower ureter with severe hydroureter

and hydropelvis. The strictured segment of the left ureter was excised, and a neo-uretero-cystostomy was done. Convalescence was uneventful and definite improvement has been noted in his general condition.

An 8-year-old boy who was first seen in May 1952 gave the history of having had since March 1950, a right nephrostomy, several plastic operations on the right ureter, and two operations on the left kidney. A thin shelled hydronephrotic sac remained on the left side, so left nephrectomy was done. Right pyelography done through the nephrostomy tube revealed severe tortuosity of the ureter and a high degree of ureterovesical obstruction. In July 1952, the right ureter was explored. As expected, severe scarring from previous operations and infections was found and obstruction at the right ureterovesical junction was practically complete. A neo-uretero-cystostomy was done. Adhesions of the upper third of the ureter were released as well as possible. The patient voided normally after this procedure and had little or no discharge from the nephrostomy wound. The nephrostomy wound was dry in November 1952. In December 1952, the patient again developed chills and fever. The right lower ureter was dilated with difficulty through the cystoscope. The right ureter was again exposed, freed from scar tissue, and reimplanted into the bladder. At the present time this boy attends school and plays hard. He has only occasional drainage through the old nephrostomy fistula; his urine shows an oceasional

pus cell.

Figure 7 is of a 35-year-old man with a normal right kidney. No kidney was seen on the left side. A mass palpable through the rectum in the region of the left seminal vesicle was present. Exploration of the left lower quadrant revealed a multilocular cystic dilatation of the left seminal vesicle with a rudimentary left kidney and ureter leading into it. The left ejaculatory duct was tightly strictured so that a probe could not be passed through it. Excision of the left seminal vesicle and rudimentary ureter and kidney was done. When we consider that the mesonephric duct gives off the vas deferens and also a pouch which becomes the metanephritic duct or adult ureter, the formation of this unusual congenital anomaly is understandable. Figures 8 and 9 show the cystic seminal vesicle, rudimentary ureter, and kidney in a closed and open state.

Let us next consider reduplication of ureters and kidneys. It must be remembered that the metanephron and ureter develop separately.

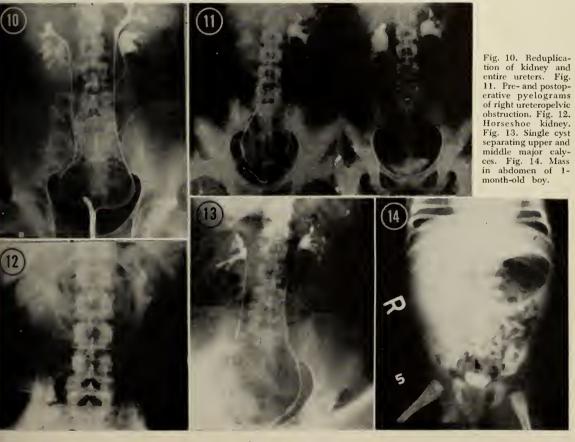
Figure 10 shows reduplication of kidneys and entire ureters, bilateral, with double ureteral orifices on each side of the bladder. It is well to remember in these cases that the lower ureteral orifice corresponds to the upper portion of the double kidney on the same side.

A 3-year-old girl had a reduplication of the right kidney and urcter with a chronic pyelonephritis in the lower half of the right kidney. This infection was recurrent and persistent in spite of all types of antibiotics. A lower right heminephro-ureterectomy was done. The patient has felt fine and has had clear urine for two years after surgery. In these cases, one ureteral orifice may be ectopic, and, if distal to the urethral sphincter, the patient may have incontinence along with normal voiding.

A left upper heminephrectomy was done to effect a cure on a 54-year-old woman with reduplication of the left kidney with a stag-horn calculus in the area of the pelvis and ureter.

Let us next consider ureteropelvic obstruction. It may be due to stricture, valve formation, anomalous vessels, or high implantation of the ureter.

Figure 11 shows pre- and postoperative pyelograms of a 23-year-old man with a right



urctcropelvic obstruction of pronounced degree due to a congenital stricture. A Y-plasty and a partial resection of the renal pelvis has effected a fairly good result.

A 65-year-old woman had a far advanced right pyonephrosis and pyoureter due to a right lower ureteral calculus. This was removed. She also had a reduplication of the left kidney with calculus pyonephrosis of the lower half. Left pyelolithotomy was performed and 354 stones were removed. At the same time a pyeloplasty for stricture of the ureteropelvic junction of the lower half of the left kidney was done. The patient is asymptomatic and has clear urine two years postoperatively.

Metanephric blastema may fuse in the midline low in the pelvis where the two kidneys lie close together before the ascent. Figure 12 represents such a case and pictures a 34-year-old man with a horseshoe kidney. In this condition the lower poles of the two kidneys are fused together in the midline. The isthmus may be simply a fibrous band or a thick parenchyma.

Pyelolithotomy was performed to remove bilateral multiple renal calculi from a woman with a horseshoe kidney. There has been no recurrence of calculi and she has had 2 normal deliveries during seven postoperative years.

An L-shaped kidney is another type of fusion in which the left kidney lies transversely with the upper pole fused to the lower pole of the right kidney, and the right kidney is in fairly normal position. A right flank incision was used to remove one calculus from the right pelvis and two from the left renal pelvis. Recovery was uneventful.

Renal cysts of various types comprise another class of renal disease, and are for the most part accepted as congenital in nature. The etiology is a failure of union between the nephron and the collecting tubule. Figure 13 shows a single cyst separating the upper and middle major calvees of the right pyelogram. Figure 14 is that of a 1-month-old boy who in September 1950 had a mass in the right abdomen. Excision of a tumor involving the right adrenal and kidney and several metastatic nodules in the scrotum was done. Microscopically the lesion was diagnosed as a congenital neuroblastoma with subcutancous metastases to the scrotum. This patient was clinically well in August of 1953 and had a normal chest roentgenogram. While these congenital tumors of the adrenal and kidney are extremely rare, a few cases have been reported. A three-year cure after removal of a congenital neuroblastoma with subcutaneous metastases is most unusual and gratifying.

In closing, I repeat my introductory plea, that these congenital lesions of the urinary tract be kept in mind, so that by earlier diagnosis and corrective treatment their salvage rate may be increased.

Local application of a 2.5% hydrocortisone acetate ointment is effective treatment for pruritus ani. Of 29 patients with chronic intractable pruritus ani observed by Richard M. Alexander, M.D., and Sylvan D. Manheim, M.D., of New York City for a period of two to five months, only 3 failed to be relieved. The ointment is applied two or three times daily. Improvement is often apparent within twenty-four hours.

RICHARD M. ALEXANDER and Sylvan D. Manheim: J. Invest. Dermat. 21:223-225, 1953.

# Physiologic Principles Governing Regulation and Maintenance of Electrolyte and Fluid Balance\*

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PRIMITIVE protovertebrates evolved in the sea where salt, water, and alkali were abundant. Upon migrating to fresh water and later onto dry land to continue existence, it became imperative for them to contain within their body a portion of the fluid medium in which they made their start. Upon further development life could not be maintained without providing accurate means of defending their internal fluid environment against changes in composition and reaction. This was the basis for Claude Bernard's important statement that "The stability of the internal environment is an absolute requirement for free life." (La fixité du milieu intérieur est la condition de la vie libre.<sup>1</sup>) These facts urge us to realize the importance of body water and electrolytes and the mechanisms regulating and maintaining them in dynamic bal-

Water comprises the biggest share among the various constituents of the living body. The electrolyte structure and acid-base equilibrium of body fluids play a major role in the reactions of the living body to disease processes. Peters² properly emphasized the importance of total body water in all types of electrolyte deficiencies. In order for electrolyte and fluid substitution therapy to be highly beneficial and least hazardous, some sound physiologic principles must be well assimilated by the prescriber. Otherwise the mere dumping of such constituents into the blood stream by rapid intravenous infusion cannot be expected to lead to the properly desired physiologic effects.

In appraising the significance of electrolyte and fluid balance in the management of surgical as well as medical patients with serious electrolyte and fluid disturbances, the fact that the

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circulating blood does not come into actual contact with the cells which depend on it for nourishment must be kept in mind. Fluids are constantly escaping from blood capillaries and returning to the blood stream either directly or by way of the lymphatics. The total area of the capillary bed in the living organism is so vast that if every capillary in the body were filled to maximal capacity the volume of the blood in actual circulation would become dangerously insufficient. Krogh³ estimated that if all the capillaries in the muscles of a man of average size were placed end to end they would stretch several times around the globe.

Such vastness may give the impression that nature is extravagant. This impression, however, can easily be avoided by realizing that the whole circulatory system is destined to reach every cell in the body to supply nutrients, oxygen, and repair materials to all the tissues and to free them of their wastes and other end-products or byproducts of metabolism. The capillaries, insignificant as they may look, are the keystones of the circulation. The capillary bed is the only region in the vascular system where interchange of various substances between the blood and the tissues can occur. The whole cardiovascular system exists for the sole purpose of regulating blood flow through capillaries where the exchange of gases for tissue respiration and the exchange of compounds and elements necessary for metabolism take place. If the capillaries of an area are put out of function, no matter how well the heart performs or how large a vessel carrying blood traverses that area, its tissues are bound to become infarcted and necrose because the capillaries fail to interchange substances between the cells of that area and the blood.

### FLUID COMPARTMENTS

The living body is made up of about 70 per cent water,<sup>4</sup> which is anatomically distributed into three main compartments, namely: (1) the vascular tree, comprising the compartment which

<sup>\*</sup>Read at the meeting of the North Dakota State Medical Association, Minot, North Dakota, May 11, 1953.

contains about 3 liters of fluid in the form of blood plasma; (2) the intracellular compartment, which contains about 29 liters of fluid; and (3) the intercellular compartment separating the vascular and intracellular compartments, constituting the internal environment of the body, which surrounds the cells and capillaries and contains approximately between 9 and 14 liters of interstitial fluid. The plasma compartment constitutes the medium of exchange, through which fluids pass in and out of the body, and on which the interstitial and intracellular compartments entirely depend for their blood supply and exchange of nutrients and wastes. It is the sole pathway by means of which nutrient substances are carried to the cells and catabolic products are carried away from them. Unless firmly held by chemical combination, this water can move freely under the influence of osmotic and hydrostatic forces. Water is the sole medium for transport of materials from one part of the body to another.

Water is absolutely essential to the life and metabolic activity of all cells. The entire purpose of the cardiovascular system, including the peripheral circulation, is accomplished by the transport of water and solutes to meet demands of the tissues for the nutrients, including oxygen and other substances, and for the removal of waste products. Particulate matter and substances in the colloidal state which escape into the interstitial spaces are removed by the lymphatics, which eventually empty into the circulating blood.

#### CAPILLARY FUNCTION

The fact is indisputable that the exchange of material between the blood and tissue cells is accomplished by the capillaries. Discovery of how this exchange is accomplished ranks in importance with the discovery of circulation itself.

The movement of the various constituents of the fluids in the vascular and interstitial compartments is governed by certain basic factors which maintain a balanced exchange between the capillaries and the interstitial spaces.<sup>5</sup> The following are the major basic factors concerned in this balanced exchange: (1) the hydrostatic pressure, (2) the colloid osmotic pressure, (3) the semipermeability of the capillary wall and cell wall, (4) the drainage and flow of lymph, and (5) tissue turgor. In addition to these major basic factors, it is essential to keep in mind the role played by physicochemical equilibria of electrolytes on the two sides of the capillary and cell membranes in regulating this balance.

The intracapillary hydrostatic pressure and

the colloid osmotic pressure in the perivascular and interstitial fluids favor the outward movement of water and diffusible substances from the vascular compartment. The return of these substances and the movement of similar substances into the vascular compartment are favored by the hydrostatic pressure of the interstitial fluids and by the colloid esmotic pressure of the proteins and protein-bound substances in the plasma. For the return of proteins, the lymphatics provide a special route and an alternate route for the return of fluid from the interstitial spaces into the vascular compartment. Starling<sup>6</sup> found that the blood proteins exert an osmotic pressure. This discovery enabled him to account completely for the exchanges in question by the opposing action of hydrostatic and osmotic forces. The hydrostatic pressure within the capillary tends to force water and solutes through its wall. The osmotic pressure within it has the opposite effect of sucking in fluids and solutes. Filtration occurs usually through the arterial side of the capillary, where the hydrostatic pressure exceeds the osmotic pressure, and absorption occurs through the venous side, where this relation is reversed, as shown in figure 1. The direction of flow is clearly indicated by the arrows.

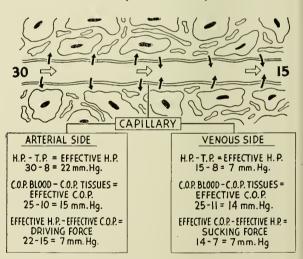


Fig. 1. Diagrammatic representation of the forces governing exchange of fluids between capillaries and tissues. Arrows indicate direction of fluid movement. H.P. = capillary hydrostatic pressure which is about 30 mm. of mercury on the arterial side and about 15 mm. on the venous side. T.P. = tissue tension which is about 8 mm. of mercury. C.O.P. = colloid osmotic pressure which is about 25 mm. of mercury in the blood plasma and about 10 mm. in the interstitial fluid.

There are two extracapillary forces which affect these exchanges: (1) the osmotic pressure of the interstitial fluid, which helps filtration and opposes absorption, and (2) the hydrostatic pressure of the tissues which has the opposite effects. These two forces, under normal condi-

tions, practically neutralize one another because they are about equal. They may have, however, under abnormal conditions, a pronounced effect on capillary function. The walls of the capillaries are not very permeable to protein molecules, but are readily permeable to water and solutes. Solutes are so quickly diffused from the blood into the interstitial fluid that they can cause only a transient difference in osmotic pressure between the two.

Rous and his associates<sup>7-12</sup> made a study of the permeability of capillaries to certain dyes. Water and crystalloids were assumed to pass much more easily through the capillary wall on the venous end than on the arterial end. In the opinion of Rous and his associates<sup>7-12</sup> this gradient of capillary permeability is an actual property of the capillary endothelium rather than a result of changes in the blood pressure or in the blood itself.

### REGULATION OF FLUID BALANCE

As long as the previously described forces for the exchange of body fluids are within normal range and are left undisturbed, the body remains in water balance. The water, eliminated with other substances through the skin, lungs, gastrointestinal tract, and kidneys, is regularly and adequately replenished through the sensitive mechanisms which regulate the demands of the body for food and drink. These processes account for the absence of dehydration, water intoxication, and edema when our body tissues and organs are performing their task physiologically.

However, disturbances may arise and offset this nicely regulated turnover of body water, so that edema or dehydration will mar the normal

picture.

### **EDEMA**

In an excellent presentation, Landis<sup>13</sup> summarized under two headings the factors concerned in the production of edema: (1) primary factors and (2) contributory factors. The primary factors are fundamental, since each of them in a sufficient degree of severity can alone produce clinical edema. The contributory factors do not in themselves produce edema but can modify the distribution or severity of the edema produced by the primary factors.

The following are the primary factors: (1) elevated capillary pressure, (2) lowered colloid osmotic pressure, (3) damage to the capillary

wall, and (4) lymphatic obstruction.

The contributory factors are the following: (1) low tissue tension, (2) high salt intake, (3) high fluid intake, (4) warm environment, and

(5) disturbed innervation. The fluid output in comparison with the intake is also an important consideration.

Clinical examples which will substantiate each of the foregoing factors are not difficult to find. For instance, the effect of clevated capillary pressure in the production of edema is seen in cases of venous congestion produced by a cardiac decompensation resulting in congestive heart failure. Thrombophlebitis or a tight bandage may lead to an increased capillary pressure and cause edema. Prolonged protein starvation and also nephroses will produce an edema attributable to a reduction in the colloid osmotic pressure of the blood. Injury to the capillary wall is apt to lead to an increase in the permeability of the endothelial wall of capillaries and to result in leakage of the plasma proteins into the interstitial spaces. The edema following burns, severe infections, or chemical injury can be attributed, at least in part, to damage to the capillary wall as well as a loss of plasma proteins. Recurring lymphangitis or an obstruction of the lymphatics by parasites or by cancerous tissue is apt to interfere with lymphatic drainage and lead to unilateral edema. The elephantiasis often observed in filariasis is a good example of lymphatic obstruction.

The mechanism of action of a warm environment in the production of edema is brought about by the vasodilatation accompanying the rise of environmental temperature which raises capillary blood pressure and increases the capil-

lary area for filtration.

Disturbed innervation may produce manifestations, such as the unilateral edema observed at times in cases of hemiplegia. However, disturbed innervation alone is rarely capable of producing edema unless a primary factor is operating to a very severe degree. For that reason edema is more conspicuous in a paralyzed extremity of patients with incipient cardiac disease than in their other extremities. In addition to the vasodilatation, which encourages filtration, the paralysis, especially the flaccid type, aids in the production of edema by abolishing muscle tone and the activity of the affected muscles. This is one of the chief factors promoting venous return and the flow of lymph.

Tissue tension is an important but neglected factor in the pathogenesis of edema. Frequently the increased tissue tension after the development of edema may be the chief factor in the arrest of its progress. Edema in nephritic patients is said to appear first around the eyes because the periorbital tissues are loose and, therefore, have an extremely low tissue pressure. This

carly and localized edema develops before the plasma proteins are reduced by leakage through the capillaries which, as the disease progresses, become damaged by toxic agents. The agent which makes the glomerular capillaries permeable to plasma proteins and leads to albuminuria in nephritis will have the same effect on the capillaries throughout the entire body. The persistent albuminuria of nephroses or nephritis reduces the osmotic pull of the plasma proteins. Their grip on intravascular water is broken and, consequently, water moves out of the lumina of the capillary bed into the tissue spaces.

Whenever a primary factor is present, edema can be quickly made apparent by administration of liberal amounts of water or by high salt intake. The salt, especially the sodium ion, is supposed to have a high affinity for water. That is why a mild restriction of salt intake is advisable in patients who are highly susceptible to edema. However, salt intake should not be restricted to such an extent that food is unpalatable and consequently superimpose malnutrition on a tendency toward edema. In a recent publication on postoperative salt intolerance, Coller and associates<sup>14</sup> stated that great care must be used in administering isotonic saline solution or Ringer's solution to patients who are hypoproteinemic, anemic, acidotic, or oliguric.

### ELECTROLYTE BALANCE

In the past fifty years major changes have occurred in the concept of fluid and electrolyte therapy. We have learned that even though preoperatively an individual can tolerate large amounts of physiologic saline solution administered intravenously, serious complications may develop in the same person in the immediate postoperative period if he is given a slight excess of saline solution. Evan<sup>15</sup> (1911), Trout<sup>16</sup> (1913), and Matas<sup>17</sup> (1924) reported the important observation that salt intolerance developed postoperatively. In subsequent years, however, several investigators emphasized the seriousness of salt loss and stressed the resultant complications. This culminated in an era, 1920 to 1936, during which time the postoperative administration of physiologic saline solution was frequently used<sup>18-24</sup> and a "clinical rule" was established "for quantitatively replacing the depleted salt" in surgical cases. During this period the emphasis of the dangers of salt depletion influenced many surgeons to prescribe saline infusions ad libitum to their patients. Consequently, excessive quantities of salt were often administered, and the syndrome of salt retention and its clinical sequelae bccame evident.

It was not long before the pendulum swung in the opposite direction and caution was sounded against this energetic and promiscuous use of saline solution.<sup>25,26</sup> This made Coller and associates<sup>27</sup> reconsider their rule in the light of the new reports, and they subsequently decided that no saline solution or Ringer's solution should be given during the day of operation or the following two postoperative days. Ariel and Kremen<sup>28</sup> found that in the same patients postoperatively a small amount of the chloride was present in the plasma, 11.9 per cent, but a much greater quantity shifted into the interstitial spaces, 67.1 per cent, where it was apparently retained and not delivered to the kidneys for excretion. They noted preoperative mobilization of the proteins into the serum in response to the salt load, but this mobilization of proteins did not occur in the same subject postoperatively. They suggested that this was the factor in preoperative retention of the salt in the plasma and that postoperative failure of mobilization of proteins into the serum permitted diffusion of chloride into interstitial spaces.

#### RELATION TO PLASMA PROTEINS

There is an intimate relationship between retention of fluid and retention of electrolytes within the circulation.<sup>29,30</sup> Subsequent to saline infusions, Stewart and Rourke<sup>30</sup> obtained an increase in total plasma proteins. In their opinion this permits the circulation of extracellular fluid between the vascular and interstitial compartments. The report of Ariel and associates<sup>31</sup> suggested that the inability of infused saline solution to elicit mobilization of proteins into the circulation to the same extent postoperatively as preoperatively is possibly related to surgical trauma and protein depletion. The preoperative urinary concentration of chloride during the first twentyfour hours after saline infusion averaged from 114 to 143 mEq. per liter, while for a similar postoperative period it averaged only from 56 to 74 mEq. per liter. The total amount of chloride excreted in twenty-four hours preoperatively averaged 16.1 gm. of sodium chloride, while for the same period postoperatively only 9.7 gm. of sodium chloride was excreted. The older the patients, the greater the salt retention.

### RELATION TO SODIUM ION

Serum sodium has a great influence on the osmotic stability of body fluids. The total body sodium is about 3,300 mEq., of which approximately 2,000 mEq. is extracellular. The quantity of intracellular sodium is exceedingly small, only 10 mEq. per liter. About 1,000 mEq. of so-

dium is estimated to be stored in bone. In normaley, the serum sodium is maintained within the narrow range of 135 to 150 mEq. per liter. The physiologic mechanisms involved in the control of this narrow range are not well understood. The kidneys handle sodium so effectively that, even though the dietary intake of sodium undergoes wide variations, only trivial changes occur in the serum sodium level. On diets low in sodium, the amount of sodium excreted by the kidneys is much reduced, while as the sodium load is increased, there is believed to be a reduction in the amount of sodium reabsorbed by the kidneys. Mokotoff and associates<sup>32</sup> reported a straight-line relationship between the amount of sodium reabsorbed by the renal tubules and the sodium load. However, Black and associates33 found that the amount of sodium reabsorbed by the renal tubules is not determined solely by the sodium load. They suggested that the delay in the readjustment to a normal or increased sodium load indicates that a hormonal mechanism may be concerned. The sodium retention observed in salt-depleted subjects is attributed to an overaction of the adrenals as a whole, leading to cortical overproduction of adrenocortical hormones. The Danfords<sup>34</sup> reported that a diet deficient in sodium chloride acts as a systemic stress causing increased production of adrenocortical hormones.

In normalcy, the kidneys, under the influence of certain steroids of the adrenal cortex and other hormones, can adjust urinary excretion of sodium and water to maintain a constant concentration and total quantity of sodium in the organism. Too rapid a loss of sodium in considerable amounts may deplete the body stores and lead to circulatory collapse. Danowski<sup>35</sup> stated that any consideration of the extracellular sodium stores must be based on a three-dimensional concept. The concentration of sodium, the volume of extracelluar fluid through which it is distributed, and the total amount of extracellular sodium must be taken into account in evaluating any critical situation.

In conditions of prerenal failure, such as cardiac failure, an increase in extracellular fluid volume accompanies the retention of sodium. The restriction of sodium intake in such conditions is a valuable practice. However, if the restriction of sodium is rigidly adhered to for a sufficiently long period to cause a severe fall in serum sodium level, it may bring about a reduction in the volume of urine excreted and cause retention of body water. There is clinical evidence for an increased retention of fluids in spite of a very low serum sodium.<sup>36–39</sup> Bristol<sup>40</sup>

produced a pronounced delay in the exerction of administered water in both rats and dogs when the levels of serum sodium were very low. He stated that, although initial dietary restriction of sodium chloride may aid in relieving edema, the serum sodium may fall to levels that interfere with excretion of urine and lead to reaccumulation of body fluids. Signs of water intoxication can be easily elicited in states of salt depletion. Schroeder<sup>39</sup> reported that in the low salt syndrome in patients, signs of water intoxication were readily observed. These signs – anorexia, vomiting, coarse fibrillary twitchings, weakness, and convulsions – were easily produced by Bristol<sup>40</sup> when water tolerance tests were given to salt-depleted animals. When the serum sodium concentration was lowered, fewer doses of water were required to bring about water intoxication.

### RELATION TO POTASSIUM ION

Not only the changes in body water but also those in acid-base balance are governed by the exchanges of sodium, potassium, chloride, and bicarbonate. The source of bicarbonate is chiefly metabolic, while that of sodium, potassium, and chloride is primarily dietary. In the light of recent advances, the cell membrane is no longer considered impervious to sodium and potassium, nor is it believed that only alterations in extracellular fluids are amenable to therapy. Recently, experimental and clinical observations<sup>41</sup> brought forth convincing evidence that rapid changes in composition of intracellular fluids can occur and seriously upset the acid-base equilibrium of extracellular fluids. The loss of potassium upsets the function of cells. In discussing the clinical physiology of potassium, Hoffman<sup>42</sup> estimated the total potassium content of the adult body to be about 4,000 mEq., of which only 70 mEq. are in the extracellular fluids. This emphasizes the fact that potassium is predominantly an intracellular cation, but does not mean that potassium cannot leave the cell. It has been clearly shown<sup>43,44</sup> that potassium escapes from the cells during its loss from the body and on its administration enters the cells. The mechanisms involved in maintaining such an unstable equilibrium are not known. Cellular anoxia is believed to lead to leakage of potassium from the cells into the extracellular spaces. In exercise<sup>45</sup> and in agonal states, serum potassium increases. In stored blood, potassium escapes from the erythrocytes into the plasma. In rats subjected to severe potassium deficiency, intestinal dilatation and failure to pass stools developed. The evidences of intestinal paralysis were relieved by administration of potassium.46 In familial periodic paralysis, the paralysis of skeletal muscles was accompanied by low plasma potassium and was relieved by administration of potassium salts. To Sometimes, in chronic nephritis in the absence of oliguria or anuria, paralyses appear and can be relieved by cautious use of potassium salts. The concentrations of potassium in serum and muscle were found low in such cases. As 48,49

Certain characteristic clinical findings which constitute the "low potassium syndrome" are encountered in hypokalemia. This syndrome is manifested by muscular weakness or even paralysis and a low broad T wave with a prolonged QT interval in the electrocardiogram. In our studies on the perfused heart, severe potassium deficiency in the perfusate led to prolongation of the P-R interval, the QRS interval, and the S-T interval and widened the T wave.<sup>50</sup>

Certain investigators<sup>51–53</sup> have shown that considerable variation exists in the appearance of the electrocardiogram at a given concentration of serum potassium. Furthermore, the concentration of serum sodium has an important influence on the results of disturbances in potassium concentration. Merrill and associates<sup>54</sup> reported that a normal serum sodium concentration antagonizes the effect of hyperkalemia in producing its characteristic electrocardiographic changes. Conversely, the reduction of serum sodium enhances the effects of hyperkalemia. This indicates the rationale for determining the concentration of both sodium and potassium in body fluids for proper evaluation of the clinical picture associated with the abnormality.

The upper limit of the normal range of extracellular potassium is about 5.5 mEq. per liter. The ingestion of potassium can temporarily increase the potassium ion concentration above this limit.<sup>55</sup> However, in those whose body stores of potassium are intact, the kidneys rapidly eliminate the increments of potassium. At times the extra potassium may enter the hepatic and muscle cells<sup>56</sup> for temporary storage; but in a matter of hours this potassium in turn re-enters the interstitial fluid and is excreted by the kidneys.<sup>57,58</sup> Two mechanisms are concerned in the elimination of potassium: (1) glomerular filtration and (2) tubular excretion.

The presence of excess potassium ions alters cellular function. The presence of high concentrations of potassium ions in the plasma leads to prolongation of conduction time through the heart, various changes in the T wave, and finally heart block. Cardiac disturbances may begin to appear at potassium concentrations of 7 mM. per litre.<sup>59</sup> a.b. Certain definite clinical signs and

symptoms occur in the presence of high blood potassium. According to Darrow and Pratt<sup>59a</sup> the following signs and symptoms have been observed in hyperkalemia: (1) listlessness and mental confusion, (2) numbness and tingling of the extremities with a sense of weakness and heaviness of the legs, (3) bradycardia and occasionally total irregular rhythm, (4) peripheral vascular collapse and low blood pressure, (5) sometimes a rapidly ascending flaccid paralysis, and (6) cardiac arrest. The hyperkalemia usually occurs in cases with great reduction of renal function associated with oliguria in shock and dehydration.

#### KIDNEY FUNCTION

Disturbances of electrolytes often develop in severe nephritis when the kidneys, because of pathologic changes, become unable to conserve water and begin to waste sodium, chloride, 60,61 and, at times, potassium.<sup>48</sup> The kidneys in such a state become unable to form acid urine and excrete ammonium salts to spare sodium and potassium. The waste of sodium and potassium and the retention of phosphates, sulfates, and other acids lead to metabolic acidosis. However, when severe oliguria is present, the retention of potassium may become so pronounced that heart block occurs. 62-64 Verney provided evidence indicating that the rate of water reabsorption by the renal tubules is under control of the antidiuretic hormone from the posterior pituitary gland. The antidiuretic hormone brings about a reduction of urinary volume whenever there is an increase of the concentration of electrolytes in the extracellular fluids or a decrease of body water. The behavior of this hormone provides a mechanism for regulating the volume as well as the concentration of extracellular fluids. However, electrolyte disturbances are not usually encountered during the polyuria of diabetes insipidus, because the renal tubules function normally in their selective reabsorption to preserve the electrolyte concentrations in the blood. In adrenal insufficiency the kidneys are unable to conserve sodium.<sup>66</sup> The administration of sodium may partially restore renal function, but the retention of potassium must not be overlooked in such cases.

In water and electrolyte deficiency, vacuolation and necrosis of the cytoplasm of the renal tubular cells have been reported. 67-72 In our work 73 we found areas of tubular degeneration and necrosis in the kidneys of animals that had been on diets without inorganic salts for a long period. Furthermore, severe depletion of water or electrolytes increased the incidence and se-

verity of renal lesions associated with jaundice.

From a detailed study of the low potassium syndrome in a case of chronic nephritis, Earle and associates<sup>74</sup> surmised that both decreased tubular absorption and increased tubular excretion of potassium were parts of the renal tubular defect responsible for the excessive loss of potassium in the urine. They found that under conditions of low potassium intake as much as 50 per cent of the potassium filtered in the glomeruli appeared in the urine. Elman and associates<sup>75</sup> made a similar statement, namely, that the kidneys have little ability to conserve potassium and often lose 50 per cent of the amount given. They suggested the administration of twice as much potassium as the deficiency shows.

They<sup>75</sup> noted that the paralysis associated with potassium deficiency included both the smooth and striated muscles with evidence of sensorial depression and coma. They also observed instability of the peripheral circulation.

### BODY WEIGHT AS A SIMPLE MEANS FOR ESTIMATING FLUCTUATIONS IN BODY WATER

The easiest and simplest procedure for following the fluid balance in patients is to take their body weight daily under identical conditions. This provides a reliable index of the fluctuation in the total body water but gives no indication as to whether the water has moved into or out of the cells or into the serous cavities. It does not indicate excess or deficiency of the constituent salts of body fluids. The use of charts recording accurate intake and output of fluids with careful analysis of the constituent electrolytes provides more accurate means for determining the electrolyte and fluid balance in hospitalized patients. It is just as vital to know when not to give electrolytes and fluids to a patient as to know when to give them to him. A simple bedside procedure for determination of chlorides<sup>76–78</sup> in body fluids has been applied in the maintenance of chloride and water balance.

### SIGNIFICANCE OF THE MILLIEQUIVALENT SYSTEM IN QUANTITATIVE ANALYSIS OF BODY FLUIDS

For appraisal and better appreciation of the physiologic significance of the various chemical constituents of body water and electrolytes, use of a measurement system expressing the chemical equivalence of each constituent of body fluids is recommended. It is most valuable in the management of electrolyte disturbances. The chief advantage of measurement based on chemical equivalence is the fact that it expresses the concentration of all the components in the same unit. Thus it is possible to add and obtain the

total concentration of all cations and anions. It is a fundamental fact<sup>79</sup> that comparison of chemical constituents of body fluids and tissues in terms of their equivalence brings us closer to what we want to know about their presence in living systems than does the comparison of their weights. Furthermore, it must be remembered that substances react on the basis of their equivalence. The unit of measurement which has recently come into common use is the milliequivalent, which is 1/1,000 of an equivalent. In normal states our extracellular fluids contain approximately a total of 155 mEq. per liter of cations, which are the base ions with a positive charge, and an equal number of anions, which are the acid ions bearing a negative charge.

Chemical laboratories in the past reported the constituents of blood and other body fluids in terms of so many mg. per 100 cc. These figures can be converted into mEq. per liter as follows:

$$\frac{\text{mg. per } 100 \text{ cc.} \times 10}{\text{atomic weight}} \times \text{valence} = \text{mEq. per liter}$$

There are factors presented in tabular form which simplify the conversion.<sup>80,81</sup>

To demonstrate the usefulness of mEq. in the management of patients with disturbances in electrolyte and fluid balance, let us apply the procedure to a clinical case for which we would like to estimate the quantity and type of solution required to replenish the electrolyte loss. This patient weighs 70 kg. The concentration of his plasma sodium was reported to be 122 mEq. per liter while the normal is 142. How much physiologic saline solution should he be given to restore his plasma sodium concentration to normal? Certain physiologic facts must be used in this calculation.

The extracellular fluid volume is considered to be 20 per cent or one fifth of the body weight. Therefore, the amount of the ion needed is:

$$\label{eq:meq} \begin{split} \text{mEq.} = & \underbrace{\frac{\text{weight of}}{\text{patient}}}_{5} \times \left( \begin{array}{c} \text{normal value} & -\text{patient's level} \\ \text{of ion in} & -- & \text{in mEq.} \\ \text{mEq. per liter} & -\text{per liter} \end{array} \right) \end{split}$$

Since the average normal plasma concentration of sodium is 142 mEq. per liter and this patient's level is 122 mEq. of sodium per liter,

$$\left(\frac{70}{5} \times 142 - 122\right) = 14 \times 20 = 280$$

 $\therefore$  Amount of ion needed = 280 mEq. per liter.

It is known the physiologic saline solution contains 155 mEq. of sodium per liter.

$$\frac{280}{155}$$
 = 1.8 liter saline solution is needed

to replenish this patient's plasma sodium to normal concentration.

Similarly, since an equilibrium must be present between anion and cation concentration in the plasma, the deficiency of cations can be estimated when only the concentration of anions in extracellular fluids is given.

### APPROPRIATE SOLUTIONS FOR REPLENISHING BODY WATER AND ELECTROLYTES

A number of solutions containing various constituents can be given parenterally to replace body water. Glucose in 5 to 10 per cent solution in water is a very effective solution for intravenous administration if the rate of injection is controlled. A slow rate of injection of 5 to 10 per cent solution of glucose to replenish body needs of water and yet not give more glucose than can be metabolized by the body at the time is often recommended. For every 100 calories metabolized, 100 cc. of 5 per cent solution of glucose provides all the glucose needed for maximal sparing of proteins and for elimination of ketosis and at the same time conserves the extracellular fluid due to glucose.<sup>82</sup>

There are a number of appropriate solutions for replenishing body electrolytes. Physiologic saline solution, 0.9 per cent sodium chloride, which is isotonic with body fluids, is the basic solution for replenishing body electrolyte. It contains the principal extracellular ions and can be easily sterilized. Isotonic saline solution contains more chloride than body fluids normally contain. Consequently, the mixture of two parts isotonic saline solution with one part isotonic sodium lactate, sixth-molar, solution will resemble interstitial fluid very closely. Hartmann's lactated Ringer's solution and an appropriate mixture of sodium chloride and bicarbonate can be made of the same composition as the interstitial fluid.

Whenever the deficit of sodium in body fluids is greater than that of chloride, an appropriate solution to use is isotonic solution of sodium lactate. Usually 70 cc. of sixth-molar solution of sodium lactate per kilogram of body weight is the maximal dose needed over a short period. Sometimes in the treatment of metabolic acidosis with excessive amounts of sodium bicarbonate or lactate, alkalosis and tetany may develop, especially if there is an uncorrected deficit of potassium. Darrow and Pratt<sup>59b</sup> developed a solution called "K-lactate," which contains 4.0 gm. of sodium chloride, 2.7 gm. of potassium chloride, and 52 cc. of molar sodium-lactate per liter. In order to avoid potassium intoxication, this solution should be given slowly subcutaneously over a period of at least four hours to supply the dose needed for one day. Not more than 80 cc.

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per kilogram of body weight is needed to replace maximal deficit of extracellular electrolyte. If "K-lactate" solution is to be given intravenously, it should be diluted with 3 parts of 5 or 10 per cent solution of glucose in water. Butler and associates<sup>83</sup> suggested for intravenous use a solution which contains 5 mM. of phosphate per liter and is similar to "K-lactate" diluted with 2 parts of 5 to 10 per cent solution of glucose in water. This solution is recommended for diabetic coma and for diarrhea. If the patient has adrenocortical insufficiency, solutions containing potassium should not be used.

In the treatment of alkalosis, ammonium chloride can be given intravenously. If the alkalosis is associated with depletion of potassium as well as of sodium and chloride, a solution of 6 gm. of sodium chloride and 2.7 gm. of potassium chloride per liter should be more effective than physiologic saline solution alone. It is advisable to dilute this solution with 2 or 3 parts of 10 per cent solution of glucose for intravenous use.

#### ROUTES FOR ADMINISTRATION OF FLUIDS

1. Oral Route. This is the best and most natural route for supplying bodily needs for water and electrolytes. However, at times when patients cannot retain fluids given by mouth because of persistent vomiting, as in peritonitis or paralytic ileus, other routes have to be used. In serious surgical procedures on the gastrointestinal tract, the oral route should not be used.

2. Rectal Route. The most favorable feature of this route is that the solutions do not need to be sterilized. Fluid can be given by the drip method at the rate of 30 to 50 drops per minute. Sometimes 300 to 500 cc. over a period of four hours can be given. The major disadvantage of the rectal administration of fluids is that the quantities absorbed may be insufficient.

3. Hypodermoclysis. The most undesirable feature of the subcutaneous route for administration of fluids is the discomfort associated with it. Hypodermoclysis causes pain locally, and the patient must lie still or at least keep that part motionless during the administration. The fluids should be isotonic and at body temperature. The skin and subcutaneous tissue must not be overstretched. There is danger of sloughing of the skin and infection in the injected area. The cardiovascular system must be adequate in order to make the subcutaneously injected fluid available to the body in due time.

4. Intravenous Route. This is the route most often used for parenteral fluid therapy. The advantage is that the fluid becomes available to the body immediately. This route is indicated

for conditions in which augmentation of blood volume and combat of dehydration are needed. It is used in parenteral feeding to provide calories and nourishment and also to promote immediate diuresis. Intravenous administration of fluids is contraindicated in cases of pulmonary edema, congestive heart failure with edema, hypoproteinemia, and extensive renal damage.

Parenteral feeding is limited to vitamins and solutions of glucose and amino acids. Recently a strong attempt has been made to prepare a fat emulsion for intravenous use. In the adult about 1 gm. of protein hydrolysate per kilogram of body weight and in infants about 2.5 gm. per kilogram of body weight are needed to supply the twenty-four hour requirements. A mixture of 2 gm. of amino acids in 225 cc. of 10 per cent solution of glucose yields about 100 calories. Such a mixture provides the caloric requirements and the water needed for each 100 calories metabolized.

5. Intraperitoneal Route. Those who advocate peritoneal lavage in cases of uremia use this route frequently.

#### PARENTERAL FLUID THERAPY

The most practical procedure for giving fluids to supply the daily requirements of body water is the intravenous drip of the appropriate solution. It has been demonstrated that postoperatively the kidneys tend to conserve both water and salt.84 This explains the interest expressed by some in limiting the intake of water and salt in the immediate postoperative period when the volume of urine is small. Between 90 and 125 cc. of water is needed for each 100 calories metabolized. Roughly the daily needs for water can be estimated at 1 cc. per calorie. The water and electrolyte requirements can be supplied by giving, out of every 100 cc., 10 to 20 cc. of isotonic saline solution of "K-lactate" and the rest as 5 or 10 per cent solution of glucose in water.

In profound circulatory collapse and shock, the transfusion of blood or plasma is very helpful in replenishing blood volume and the oxygen-carrying capacity of the blood. However, in the absence of whole blood or plasma, the infusion of about 30 cc. of physiologic saline solution per kilogram of body weight is sound practice. In the presence of metabolic acidosis, the use of a mixture containing 1 part isotonic solution of sodium lactate and 2 parts isotonic solution of

sodium chloride is better than solution of sodium ehloride alone. In metabolic alkalosis, solution of sodium chloride alone is better, but the intravenous use of calcium chloride or gluconate is recommended.

In states of severe dehydration, the loss of water and electrolytes in infants can be restored by use of 80 cc. of the appropriate solution per kilogram of body weight. In adults 70 cc. is sufficient. It may take about six days to replace the deficit, because at least that length of time is needed for the cells to make adjustments for the deficiency. In addition to the deficiency of sodium chloride, a deficiency of potassium is often present. No more than 3 mEq. of potassium, 0.22 gm. of potassium chloride, per kilogram of body weight is usually needed.

#### SUMMARY

The physiologic factors governing the normal exchange of body water and electrolytes between the cells, the blood vessels, and the tissue spaces in the living organism are explained. In the normal organism the fluids and salts in the body are maintained in a dynamically stable equilibrium by the interaction of various factors on the intake water and salts. The regulation of the output of water and the various constituents resulting from metabolic activity throughout bodily tissues is carried out in a very precise manner by the kidneys, gastrointestinal tract, lungs, and skin, which are the excretory organs of the body and the avenues for the normal excretion of bodily wastes and surpluses of water and salts. As long as the factors governing this exchange and the excretory organs act normally, the body stays free of edema and dehydration.

The importance of various substitutes for blood and body water and salts is explained. These substitutes and the indications and contraindications for their use in medical and surgical conditions before and after operation are stressed. The difference in the way the body handles fluids and salts before operation as compared with after operation is presented.

Because of limited space, references have been omitted and will appear in the author's reprints.

Figure 1 is reproduced by permission from K. G. Wakim and W. D. Gatch: Physiological principles governing the normal and abnormal distribution of body fluids. Quart. Bull. Indiana Univ. M. Center 6:51-55, 1944.

## Current Applications of Tissue Cultures in Medicine

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A NEW diagnostic laboratory method has recently been developed which may, within the next several years, be sufficiently widespread in use to be of great value to practicing physicians. This method, tissue culture, promises to provide an inexpensive, yet accurate means for the diagnosis of virus diseases.

Tissue culture has for many years been a technic employed for experimental study by investigators in the medical sciences. Anatomists, physiologists, biochemists, pharmacologists, cancer biologists, pathologists, and microbiologists have obtained information by the cultivation of tissues in vitro. Mammalian or avian tissues have been commonly employed, though amphibian and plant tissues have also been studied. For example, Harrison, who initiated work in this field in 1907, utilized amphibian nerve tissue. From 1910 until the middle of 1930, the center for tissue culture work in America was in Carrel's laboratory at the Rockefeller Institute. The serial passage in vitro from culture to culture, of cells from the heart of a chicken embryo was carried on in that laboratory for a period of over twenty-five years. It was Carrel and his associates who developed many of the basic technics for the cultivation of cells in vitro.

Today, by the application of tissue cultural methods, strains of cells are kept alive *in vitro* year after year and are available for experimental use in the medical sciences. This procedure has enabled virologists to employ tissue cultures rather than animals for the study of certain virus diseases. For example, in the department of bacteriology and immunology at the University of Minnesota, the monkey has been almost completely replaced by cellular cultures for experimentation with poliomyelitis virus.

METHODS AND MATERIALS EMPLOYED FOR THE CULTIVATION OF ANIMAL CELLS IN VITRO

Tissue cultural technics were originally shrouded with mysticism and involved with rituals to

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avoid contamination of cultures with microorganisms. However, as the use of tissue cultures became more generalized, many of the apparent technical obstacles were replaced by ordinary bacteriologic procedures. As a result, tissues are now cultivated chiefly by use of equipment found in the bacteriologic laboratory.

Three basic methods are employed for the cultivation of cells in vitro: (1) tissue fragments are suspended in a liquid medium; (2) individual cells or small clumps of cells are suspended in liquid; and (3) cells are grown on a solid surface.

When tissue fragments or clumps of animal cells are suspended in liquid medium, cells survive for from several days to several weeks. However, very little cellular multiplication occurs, and, therefore, prolonged maintenance of a cellular population is impossible.

Unlike bacterial cells, animal cells, with one exception, do not proliferate when in suspension. Cells derived by Gey and associates from a mouse lymphoblastoma have recently been maintained *in vitro* in suspensions kept constantly in motion.<sup>1</sup>

Aside from this exception, a generalization can be made that animal cells must be attached to a surface for cellular division to occur. Thus, most methods for the long term cultivation of animal cells *in vitro* employ a physical substrate. This surface is usually either glass or the surface provided by strands of fibrin in clotted plasma. However, cellulose sponge and cellophane have also been utilized.

The shape and size of vessels used for tissue culture have varied greatly. Small specialized flasks, such as the Carrel flask, ordinary test tubes, Erlenmeyer flasks, and hollow ground slides have been employed. The shape of the vessel is relatively unimportant if it is made from hard glass and shaped so that cells are covered by a thin layer of liquid medium.

Two principal constituents must be present in the liquid phase of cultures of animal cells for cells to proliferate. Either serum or a body fluid

such as ascitic fluid or aqueous humor is usually used. This ingredient provides materials chiefly for the survival of cells, although some growth of cells occurs in serum. Either homologous or heterologous serum may be used, though homologous serum is usually superior. The second portion of the liquid medium is a tissue extract that furnishes factors essential for the growth of cells. Usually aqueous extracts from embryonic tissues are used. However, extracts from tumor tissues, bone marrow, or adult tissues stimulate the growth of some cells. Since undiluted serum or tissue extract is unnecessary for the cultivation of animal cells, these materials are diluted so that serum makes up onethird or one-half and tissue extract one-hundredth to one-tenth of the total medium. The diluent consists of a solution of inorganic salts similar in composition to extracellular body fluid.

For the growth of animal cells, temperatures from 30 to 37° C. are essential. The rate of cellular growth increases proportionately to the temperature.

### MAJOR CELLULAR TYPES

The name tissue culture is for the most part a misnomer, for actually cells, not tissues, proliferate *in vitro*. A more appropriate name is cellular culture. Two types of celluar growth occur in cultures: *unorganized growth*, where the arrangement of cells has no resemblance to the original pattern in the tissue, and *organized growth*, where cellular differentiation and histologic relationships among cells are maintained.

Unorganized cellular growth *in vitro* occurs when small pieces of tissue, referred to as explants, are placed in clotted plasma or on a glass surface and are covered by a serum-extract mixture for incubation at 37° C. The corona of cells which develops around the explant results from both cellular proliferation and cellular migration. Within the explant relatively little cellular multiplication occurs, although much of the histologic organization of cells is retained.

Three patterns of unorganized cellular growth occur from tissues explanted *in vitro*: (1) a reticular pattern — a network of spindle-shaped cells or fibroblasts communicating with one another by long branching cellular processes (figure 1), (2) epithelial growth — polygonal cells forming sheets or membranes, usually one cell in thickness (figure 2), and (3) an amoeboid pattern — no organization, cells entirely independent of one another (figure 3). Reticular growth occurs from tissues of mesenchymal origin, such as muscle, areolar tissue, and sarcomas; epithelial growth from tissues that contain epithelium,

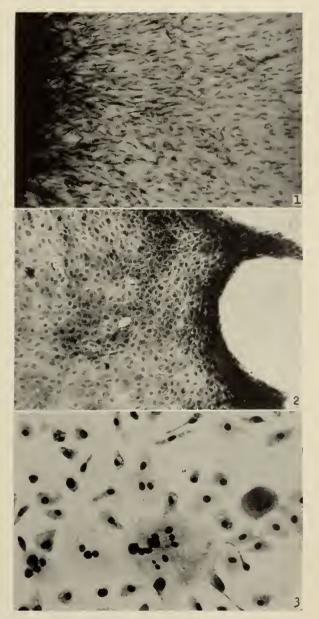


Fig. 1. Normal fibroblasts from monkey testicular tissue. Fig. 2. Normal epithelial cells from rabbit cornea.

Fig. 3. Normal macrophages from white blood cells of chicken

such as skin, liver, intestine, and carcinomas; and amoeboid growth from tissues composed of blood or reticuloendothelial elements, such as marrow, spleen, and lung.

Organized growth and histologic differentiation of cells can be made to occur in vitro when attention is directed to the cells within the central piece of tissue rather than to the peripheral corona of cells. Embryologists in particular have employed this technic for the study of developing organs and body rudiments.

Most changes in cellular morphology or physiology that occur when a cell is cultivated in vitro are reversible. Moreover, these alterations do not involve any gain in the number of potential functions of a cell such as occur when cells dedifferentiate. For example, the change, in vivo, of seminal vesicular epithelium from columnar to cuboidal epithelium upon castration of an animal is a reversible alteration in cellular morpholgy, since after administration of testicular hormone the epithelium again becomes columnar. If dedifferentiation had occurred, the cells would have reverted to a primitive stage and become capable of developing not only into seminal vesicular epithelium, but also into epithelium of the nearby genitourinary tract organs which had the same embryologic derivation. The alterations of cells upon cultivation in vitro are thought to be similarly reversible.

A specific function for cells *in vitro* is often suppressed when the cells grow rapidly, and returns when the cellular growth rate is slowed. For example, embryonic heart muscle cells fail to contract when stimulated to grow rapidly *in vitro*, but contract rhythmically when grown at a slower rate.

In essence then, cells cultivated from tissues in vitro assume a reticular, epithelial, or amoeboid pattern of growth. Although cells from different tissues may have identical morphology in vitro, they retain their potential to be morphologically and physiologically different.

### APPLICATIONS OF TISSUE CULTURE IN THE MEDICAL SCIENCES

Tissue culture in anatomy. The anatomist recognized early the value of cells cultivated in vitro for detailed studies in cytology. For example, tissue cultures made possible continuous cinephotomicrographic observations of living cells in mitosis and of cells under the influence of drugs or irradiation. The thinness of cells in tissue cultures has made them particularly useful for the study of intracellular structures by electron micrography.<sup>2</sup>

Transformations of one cell type to another, such as the conversion of blood monocytes to macrophages, have been studied *in vitro* by employing tissue cultures.<sup>3</sup> The application of histochemical staining methods to monocytes from chicken blood and to macrophages derived *in vitro* from these monocytes has shown that while the parent monocyte is devoid of stainable carbohydrate, lipid, or acid phosphatase, the macrophage that develops *in vitro* from the monocyte contains periodic-acid-Schiff positive material and acid phosphatase in the centrosphere

or Golgi zonc. Thus, the macrophage manifests new activities as it forms from the monocyte.

The embryologist has used tissue cultural methods to study the development of embryonic rudiments. For example, Fell and Robison<sup>4</sup> cultured the femur from a chicken embryo and showed that normal shape occurred in the absence of stresses from adjacent muscles.

Tissue culture in physiology and physiologic chemistry. When the physiologist applied the methods of tissue culture to the study of muscle physiology, it was soon demonstrated that muscle cells cultivated in vitro contract even though completely denervated.

The probable explanation for the occurrence of sear tissue at the site of trauma to a muscle is suggested by observations of muscle and connective tissue cells in vitro. Connective tissue fibroblastic cells multiply in vitro rapidly after a lag period of only one to two days. Muscle cells, on the other hand, begin to grow only after one to two weeks in culture. Thus, the delayed lag period for muscle cells probably permits the rapidly growing connective tissue cells to fill in defects at the site of trauma before muscle cells regenerate.

Hormone replacement therapy has been successfully carried out by implanting organs maintained *in vitro* into patients with hormone deficiencies. Stone and his associates in 1934<sup>5</sup> and Kooreman and Gaillard in 1950<sup>6</sup> removed portions of parathyroid and thyroid glands from full-term babies who were born dead. By tissue cultural methods, parathyroid tissue was preserved for from thirty to sixty days. Upon surgical implantation of the parathyroid tissue into patients with postoperative tetany, parathyroid hormones were secreted by the implanted tissue in quantities sufficient to correct the hormone deficiencies.

Tissue culture in pharmacology. Tissue cultures have been used in pharmacology chiefly for two purposes: (1) for the evaluation of drug toxicity and (2) for determination of the effectiveness of antiviral substances.

Pomerat<sup>7</sup> has listed the advantages of tissue cultures for drug assays as follows:

- 1. Tissue cultures are inexpensive when compared with the costs for laboratory animals.
  - 2. Results are obtained in one to three days.
- 3. The test systems are genetically homogeneous if strains of cells or tissues from one animal are used for a single series of tests.
- 4. Toxicity of a drug for a variety of cell types derived from different tissues may be determined with equal ease—malignant vs. nonmalignant cells, embryonic vs. adult tissues, or a variety of organs. Moreover, human cells may be employed as easily as animal cells.

The use of tissue cultures for the evaluation of antiviral substances is now becoming more widespread. For a virus such as poliomyelitis, whose host range does not include the usual laboratory animals, cultures made from susceptible tissues afford an inexpensive means for the evaluation of antiviral substances.

Tissue culture in cancer biology. Malignancy has long been recognized as a disease occurring at a cellular level. This fact has led many investigators in cancer biology to study the isolated malignant cell in vitro. Early studies showed that malignant cells are independent of host factors for their malignancy, since after cultivation in vitro for long periods of time, they retain the capacity to produce tumors upon inoculation into an animal host. On the other hand, normal cells have become malignant while being cultivated in vitro, for example, the transformation of normal mouse connective tissue cells into sarcomatous cells.<sup>8,9</sup>

Diagnostic classification of certain tumors can be facilitated by cultivation of the tumor tissue *in vitro*. For example, sympathicoblastomas may histologically be difficult to distinguish from lymphosarcoma or Ewing's tumor. Yet, when cultivated *in vitro*, typical neural cells migrate from the tissue to make evident the diagnosis of sympathicoblastoma, usually within twenty-four to forty-eight hours.<sup>10</sup>

Cultures of tumor tissue have been used to assess oncolytic effects of drugs and viruses. For example, the oncolytic properties of podophyllin have been studied in tissue cultures. When West Nile virus was added to cultures of human epidermoid carcinoma, destruction of the cells occurred. When West Nile virus was used to infect man with malignant tumors, 4 of 27 patients who became infected with the virus showed transient retardation of tumor growth. Of these 4 patients, 2 had large bowel adenocarcinoma; 1, a reticulum-cell sarcoma; and 1, a thymoma.

Tissue culture in microbiology and pathology. The greatest promise for the practical usefulness of cellular cultures is for the diagnosis of infectious diseases, particularly virus diseases. Yet tissue culture has not been limited in microbiology to the study of viruses. Host-parasite relationships between animal cells and bacteria, fungi, and protozoa have been studied in vitro in cellular cultures. The cultivation of intracellular bacteria such as Mycobacterium leprae is currently under study in tissue cultures. Histoplasma capsulatum has been shown to infect chicken embryonic cells in vitro. Trypanosoma cruzi, Leishmania donovani, toxoplas-

ma, and the exoerythrocytic forms of some plasmodia have been cultivated successfully.<sup>16</sup>

However, the most extensive studies in microbiology that have utilized tissue cultures concern host cell-virus relationships. The applications of tissue or cellular cultures to virology are listed in table 1. From table 1 it can be seen that both theoretic and practical problems in virology have been studied by the use of tissue cultural methods.

### TABLE 1 APPLICATIONS OF TISSUE CULTURE IN VIROLOGY

Investigative Problems

- 1. Tissue and cellular trophism
- 2. Virus inclusion bodies
- 3. Interference phenomenon of viruses Coexistent viral infections
- 4. Metabolism of cells infected with viruses
- 5. Mode of antibody action upon viruses

Practical Problems

- 1. Measurement of virus
- 2. Isolation and typing of virus
- 3. Production of virus
  - a. Complement fixation antigens
  - b. Vaccines
- 4. Assay of neutralization antibodies

Identification of various tissues as sites for the multiplication of virus has been accomplished chiefly by the use of tissues cultivated *in vitro*, since only by such means can tissues be isolated from the host for study. The human viruses that were grown in tissue cultures are listed in table 2.<sup>17</sup> It is apparent from table 2 that a variety of human viruses were successfully propagated *in vitro* in tissue cultures. Since embryonic tissues have the capacity to grow rapidly *in vitro*, they were employed for most experiments.

An example of the use of tissue cultures for the study of viral trophism is the identification of human skin, muscle, and intestinal tissues as host tissues for poliomyelitis virus. These observations would have been difficult to make in man since no lesions occur in those tissues. Yet, the cultivation of these human tissues *in vitro* showed that they support the multiplication of poliomyelitis virus and that the cells are destroyed by the virus.

Likewise, individual cells can be identified in cellular cultures as host cells for viruses. For example, human epithelial cells and human fibroblastic cells have been shown to propagate poliomyelitis virus. The demonstration *in vivo* that such cells possess the capacity to support the multiplication of poliomyelitis virus would indeed have been a difficult task.

Tissue cultural methods have been employed for the investigation of virus inclusion bodies

TABLE 2 HUMAN VIRUSES SUCCESSFULLY PROPAGATED IN TISSUE CULTURES

	V HISSEL CELIERE	
Neurotropic viruses	Host species 1	lost tissues
Anopheles A and B	Chicken embryo	whole emhryo
Equine encephalitis	Chicken embryo Rat	whole embryo fibrobasts and sarcoma cells
Herpes simplex	Chicken embryo Rahbit	whole embryo testis, cornea
Ilheus encephalitis	Chicken emhryo	whole embryo
Japanese B. encephalitis	Chicken embryo	liver, heart
Lymphocytic choriomeningitis	Chicken embryo Mouse embryo	whole embryo whole embryo
Poliomyelitis	Human embryo Human infant	brain, cord, intestine, skin, muscle foreskin, kidney
	Human adult	testis, fibroblasts, epithelium
	Monkey—immature Monkey—adult	testis, kidney, muscle
Rabies	Chicken embryo Mouse embryo Mouse ( to age 14 days )	whole emhryo, brain brain brain
	Rabbit embryo	brain
St. Louis encephalitis	Chicken emhryo Mouse embryo	whole embryo whole embryo
West Nile encephalitis	Chicken embryo	whole embryo
Other viruses	Host species I	Iost tissues
Epidemic kerato- conjunctivitis	Mouse embryo	whole embryo
Lymphogranuloma venereum	Chicken embryo	chorioallantoic membrane, whole embryo
	Mouse Guinea pig embryo Human-thyroid	brain, spleen, testis brain fibroblasts
Influenza	Chicken embryo	amniotic and allantoi membranes, brain
Mumps	Chicken embryo	amniotic membrane
Psittacosis	Chicken embryo	whole embryo, muscle, skin, lung
	Mouse	spleen
Rift Valley fever	Chicken embryo	whole embryo
Vaccinia	Chicken embryo Chicken Rabbit Guinea pig	whole embryo kidney cornea, testis cornea
Yellow fever	Chicken embryo Mouse embryo Mouse	whole embryo whole embryo testis, placenta, tu- mors (sarcoma 37
		caricnoma M63)

since cells cultivated *in vitro* can readily be examined microscopically as single isolated cells. Recently, in our laboratory, the development *in vitro* of inclusion bodies in rabbit corneal cells has been studied. The experimental results showed that a single corneal cell *in vitro* can become infected simultaneously with the viruses of pseudorabies and vaccinia, and that different morphologic forms of intranuclear pseudorabies inclusion bodies occur which are taken to represent developmental stages of the inclusion.

The experimental approach to the metabolism of animal cells by the employment of cells cul-

tivated *in vitro* is in an early developmental stage. Until recently, cultures of single cell types have not been available for such studies. In the ordinary tissue culture, many types of cells exist, such as epithelium, fibroblasts, and endothelium. Yet for metabolic studies, cell types must be studied singly so that the metabolism of other cells does not affect the experimental data. However, recent advances in tissue culture now make it possible to use strains of epithelial cells and fibroblasts for the study of normal cellular metabolism and of the metabolism of cells when infected with viruses.

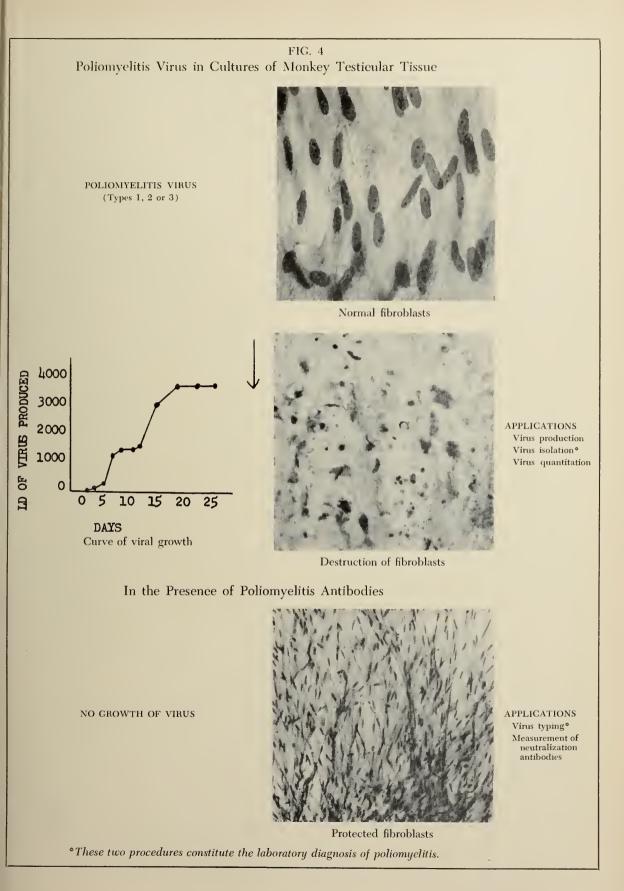
The failure of antibodies to influence the clinical manifestations of virus infections has been attributed to the inability of antibodies to affect the virus after it invades cells. This phenomenon was demonstrated to occur in tissue cultures. Andrewes<sup>19,29</sup> showed that antibodies prevented the occurrence of virus III and herpes simplex inclusions in rabbit testicular cells only when added before virus.

The cultivation of viruses in tissue cultures has in certain instances provided inexpensive test objects for viral detection. Recent advances with poliomyelitis virus serve as the best exam-

ple of this method applied to virology.

Poliomyelitis virus was first cultivated in 1936 in human embryonic nerve tissue<sup>21</sup> and in 1949 in extraneural human embryonic tissues such as skin, muscle, and intestine. 18 Although virus can be detected in cultures of human embryonic tissue by virtue of its cytopathogenic effect, the difficulties in obtaining large supplies of human embryonic tissues prohibited any large scale utilization of these tissue cultures for the diagnosis of poliomyelitis. Experimental studies were therefore carried out with monkey tissues. As a result, testicular tissue was found to propagate virus readily.<sup>22,23</sup> Moreover, the presence of virus was made apparent by microscopic observation of the cultures, since virus caused pronounced destruction of cells. This destruction of monkey testicular cells by poliomyelitis virus is illustrated in figure 4. It can be seen that the addition of virus, type 1, 2, or 3, to normal monkey testicular fibroblasts results in total destruction of the cells and the growth of virus as portrayed by the growth curve.

Tissue cultures made from monkey tissues afford a more practical method for the investigation of poliomyelitis in the laboratory for two reasons: (1) monkeys are available in large numbers through the facilities of the National Foundation for Infantile Paralysis, Inc., and (2) the tissues from one monkey are sufficient to provide from 50 to several hundred cultures.



Four practical problems in poliomyelitis virus research for which tissue cultures are of value are listed in table 1. Virus is measured by the addition of serial dilutions of viral material to test tube cultures of monkey testicular tissue. The highest dilution of virus material that produces cellular destruction is taken as the titration end-point. Isolation of virus is accomplished by the inoculation of cultures with suspensions of feces from patients. Nonspecific degeneration of cells occurs occasionally even though the fecal suspensions are clarified by high speed centrifugation. Therefore, it is essential to show (1) that the cytopathogenic agent isolated will pass serially from one culture to another, and (2) that the presence of poliomyelitis antibody in the cultures will prevent the destruction of cells. In effect, if type specific antibodies are employed, this latter procedure types the virus as type 1, 2, or 3 (figure 4).

Monkey tissue cultures are capable of producing poliomyelitis virus efficiently, in large quantities, and in a relatively pure state. Virus usually multiplies several thousandfold in monkey testicular tissue cultures (figure 4). Studies of the growth curve for type 2 poliomyelitis virus in cultures of monkey testicular tissue showed that virus was produced on the average from five to seven days after inoculation of the cultures.<sup>24</sup> The release of virus from the cells was accompanied by destruction of cells. Occasion-

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Poliomyelitis antibodies can be detected and quantitated in a patient's serum by inoculation of the serum and a known poliomyelitis virus into tissue cultures. If antibody is present, the cytopathogenic effects of the virus will be prevented (figure 4). By the use of serum dilutions, antibody can be quantitated. Prior to the advent of tissue cultures, tests for poliomyelitis neutralization antibodies were performed in mice, for type 2 virus only, or in monkeys. The tissue culture method is not only less expensive than the use of animals but is equally applicable to all 3 types of virus.

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## The Management of Anxiety\*

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Anxiety enters into the life of practically every human being and, because it sometimes can be disabling and cause its sufferers to seek medical advice, every physician regardless of his specialty encounters this condition almost daily.

Anxiety really begins at birth. The newborn infant is an extremely insecure individual. Dr. Edith F. Weigert<sup>1</sup> stated, "As soon as the infant is born he is in the throes of a battle between life and death. As soon as he is born he is old enough to die. The revolutionary change from the intrauterine to extrauterine existence leaves the infant in an extremely vulnerable position, in fact, in a state of shock. The passage, head first, through the narrow birth channel, the change from the prenatal to the postnatal form of breathing with the danger of being strangulated or suffocated, the alterations of circulation, the impact of new stimuli, pressure, pain, and temperature change, all these implications at birth leave the infant in a traumatic state. In his first days breathing is shallow, sleep is superficial and fitful, and spastic reactions indicate the deeply disturbed balance of the organism. The trauma of birth cannot be experienced in any form of consciousness, but all emergency situations in later life reproduce the same physiologic response as that to the trauma of birth. I described this emergency situation before as the mobilization of the systems controlled by the sympathicus. Even the reflectory cry is reproduced in panic states."

Even though Dr. Weigert states that the trauma of birth cannot be experienced in any form of consciousness, we must presuppose a certain state of awareness on the part of the infant. Consciousness itself is very difficult to define. Someone described consciousness as a sensory organ. Hughlings Jackson, the great English neurologist, called it "a function of the brain." Schiller<sup>2</sup> described consciousness as "awareness of environment and of self," but no one has

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located a center for consciousness. Maybe there isn't a true "center." Possibly the condition we call "consciousness" is a combined function of all of the components of the body—cellular, neural, humoral, electrophysical, physiochemical, and so forth.

Even so, the fact that memory traces of our earliest primal experiences are preserved somewhere in the body, probably in the centrencephalon, is quite certain. A current hypothesis is that the brain contains relays, reverberating circuits, potentiating mechanisms, and other devices which make it possible for unconscious and forgotten experiences to be preserved for years, later on to be activated and produce anxiety or other symptoms. Therefore, any traumatic emotional experience or series of experiences, regardless of when during the span of life they occurred, can produce anxiety. The time of the traumatic experience and the depth at which the memory traces are buried in the unconscious levels of the personality influence to a great degree the method of treatment and prognosis for relief of anxiety or its somatic manifestations.

After birth many things can cause insecurity and, therefore, anxiety. The second important event in the life of the newborn is feeding. When the infant cries or appears to be fussy or upset, the mother puts something into his mouth and fondles him. Therefore, a very close relationship exists between receiving love and comfort and having something put into one's mouth. Many obese people, especially children and adolescents, are compulsive eaters. These people usually are tense and anxiety-ridden and experience a sense of relief when they put something into their mouths. The same principle applies to many adult alcoholics. They don't like the taste of liquor, they don't crave its intoxicating effect, but they derive satisfaction from the oral stimulation which the ingestion of strong drink brings about. The shudder occurring when a person swallows a powerful "shot" has been called an "intestinal orgasm." People who like strong drink often smoke a great deal, enjoy

<sup>\*</sup>Read before the Annual Meeting of the North Dakota State Medical Society, Minot, North Dakota, on May 12, 1953.

highly spiced foods, and love to talk. They are

called "oral personalities."

Anxiety about bowel function frequently can be traced to infancy and early childhood. The child's feeling of prestige rises or falls according to whether the mother is pleased or perturbed by his toilet behavior. To be rebuked by the parent creates anxiety. Later in life, if irregularity in bowel function occurs, anxiety develops. This anxiety causes further interference with climination—either constipation or so-called mucous colitis and then come the colonic flushes, diets, cathartics, and visits to various institutes, quack clinics, and so forth.

Another frequent cause of anxiety during childhood is emotional insecurity. For a child to feel emotionally secure, a good relationship must be present between the child and the parents. Rejection by the parents resulting from the fact that the child was unwanted or from favoring of one of the other siblings creates emotional insecurity. This may result in behavior disturbances or somatic symptoms during childhood as well as later in life. Rene Spitz has shown that emotional deprivation during the first months of life may be the sole cause of marasmus, retarded physical and mental development, and even death. In addition to rejection, overprotection during childhood can produce anxiety. The parent who is excessively concerned about the health, safety, and welfare of the child or the parent who is excessively concerned about his or her own health is sure to generate anxiety in the child. One of the first questions I ask a psychoneurotic patient is "Which one of your parents was the nervous or anxious one?" The patient usually describes one or both parents as having been chronically ill, overly concerned about his or her own health, and attentive to every minor physical symptom which nearly everyone experiences at times.

Anxiety can be communicated from parent to child at the nonverbal level. Before the child is even able to understand the spoken word, he is sensitive to changes in muscle tension, pulse rate, depth and rate of respiration, and possibly to other physiologic changes in the parent when the parent is anxious. I cannot recall the reference but there is in the literature a report by either a pediatrician or a psychiatrist who was stationed at a large port of embarkation during World War II. At this port were a large number of mothers whose husbands were either being shipped out or were returning home for discharge. A study was made of the infants and very young children accompanying these mothers. The incidence of cyclic vomiting, diarrhea, malnutrition not due to dietary deficiency, neurodermatitis, and other functional disorders was significantly higher among the youngsters whose fathers were leaving than among those whose fathers were returning. The conclusion was reached that the mothers did not need to verbalize their fears and anxicties in order for the children to become inoculated with anxiety at the nonverbal level.

Traumatic experiences in school often cause anxiety in children and may lay the foundation for anxiety reactions and psychosomatic disorders in later life. It has been said that the school teacher is like a big mother or father and that all children are like brothers and sisters. However, from a practical standpoint it doesn't work that way. There usually are 30 to 40 children in a class and a teacher cannot manage to be a good mother to each one of them. Therefore, most of the children are bound to be slighted at one time or another. Moreover, not all teachers are themselves well balanced. Some are unhappy in their work, some are impatient and irritable, some are overworked and underpaid, and many are neurotic and have phobias of their own which are communicated to the children. Moreover, if a child has a handicap such as a stammer or a limp or if he differs from the rest of the group in some other way, he is ridiculed by the others and develops inferiority feelings, anxiety, and tension.

Practically every physician is familiar with the anxiety reactions associated with sexual experiences, so this aspect of the problem of anxiety will be mentioned only briefly. Probably the most frequent type of anxiety associated with sex during adolescence is that accompanying masturbation. Some parents still tell their children that if they masturbate they will lose their minds. Adolescent pimples are attributed to masturbation. Tics and spasms are said to be the result of the practice, and a host of other penalties are attached to behavior that is normal for the majority of adolescents. To me it is significant that masturbation is called "self-abuse." One child psychiatrist suggested that the name be changed to "self-amusement." I am not recommending that masturbation be encouraged and extolled, but since all boys and most girls masturbate during some period of their lives, I feel that parents, clergy, and teachers should be told not to create more anxiety by adopting punitive attitudes.

I regret to say that in some instances, physicians are responsible for anxiety reactions in their patients. Dr. George Fahr, professor emeritus of medicine at the University of Minnesota,

recently told me that in the management of coronary disease, it is of extreme importance from the outset that the physician allay not only the patient's anxiety but also the anxiety felt and too often expressed by the family. Dr. Fahr says that even at the risk of being overly optimistic, the physician must be as reassuring to the patient and to the family as possible and avoid too frequent blood pressure determinations, electrocardiograms, and other tests. Very frequently coronary disease is accompanied by a true depression. I have seen numerous cases in which anxiety and depression were augmented and prolonged by too much insistence on having the patient follow a walking schedule requiring him to count the number of steps he takes each day, even when the quota reached several hundred.

We speak of iatrogenic disorders, that is, symptoms such as anxiety which are either induced in the patient by too much treatment, too many examinations, unguarded remarks by the physician, or by the physician's failure to explain to the patient the nature of his illness and the fact that the prognosis is favorable. Elsewhere<sup>3</sup> I have called attention to the importance of relieving anxiety when treating even such relatively simple conditions as multiple neuritis. "Especially while the patient is confined to bed and suffering a great deal of pain, and more especially in cases involving motor paralysis, psychotherapy is extremely important. The patient is anxious, bewildered, uncertain about his future, and tends to be irritable and complaining. Therefore, it is important that the practitioner spend some time with the patient each day. It is not enough merely to walk into the patient's room accompanied by a nurse, look at the chart, ask the patient how he feels, and then depart. The physician should sit down alone with the patient for a few minutes, give him an opportunity to ask questions, and explain to him in a reassuring way that he will ultimately get well but it may take considerable patience for him to wait for his recovery. Adequate psychotherapy reduces the necessity for analgesics and narcotics and sedatives by an appreciable percent."

There are two kinds of anxiety, central or "free-floating" and peripheral anxiety. Central anxiety originates in early life, is pervasive in the personality, and from time to time manifests itself in one form or another. It may appear as a diffuse feeling not associated with any single experience or set of experiences in the life of an individual, as a morbid fear, a sense of impending disaster, or as a psychosomatic symptom. Peripheral anxiety, on the other hand, is related to more recent experiences; for example,

loss of a loved one, domestic difficulties, business worries, and so forth. Just where central anxiety stops and peripheral anxiety begins is sometimes hard to say. In general, however, a study of the history of the patient helps solve the problem.

Let us now consider the management of anxiety in general. Fortunately, in many instances simple reassurance by someone in whom the patient has confidence and trust suffices. If the patient feels that his doctor understands his problem, is sympathetic, willing to take the time and have the patience to listen to his story and explain to him something about why he feels as he does, what anxiety is, and what it does to a person, the patient will feel better without further intensive analytic treatment. While I deplore the "bromide and pep talk" type of psychotherapy, I still feel that much harm can be done by too extensive and intensive probing into the patient's deeper psychologic mechanisms.

Too many doctors feel threatened by a therapeutic situation in which the management of anxiety is the main part of the job. A feeling is present among general practitioners as well as among many specialists in the various fields that one must possess some sort of magic cloak to practice psychotherapy. But Fiedler<sup>4</sup> has said, in effect, that to bring about improvement in a patient suffering from an emotional disorder is a function of expertness of the therapist rather than of school affiliation. Lucero<sup>5</sup> states that therapeutic skill bears little relationship to intelligence, knowledge of abnormal psychology, or adherence to a certain school of psychotherapeutic thought; but that it might be related to something entirely different - perhaps highly developed intuitive social skills coupled with love and respect for human beings. Although Lucero was discussing the treatment of schizophrenia, I believe that what he said applies also to the treatment of many of the anxiety states. It has been said that effective psychotherapy for the mild anxiety states can be summed up by the letters R.S.V.P. "R" stands for reassurance, which has been mentioned. "S" stands for suggestion which includes everything from verbal suggestion to hypnosis as well as the occasional use of mechanical devices such as high frequency currents, massage, and relaxing exercises. "V" stands for ventilation. It is extremely important to allow the patient to talk his troubles out. This requires patient listening by the doctor. At no time should the doctor show signs of shock or disapproval of anything that the patient tells him regarding his past experiences, be they sexual peccadilloes, theft, or other transgressions upon the Ten Commandments. Psychotherapy has no

place for moral or value judgments. Inasmuch as there is no right or wrong in the unconscious and inasmuch as much human behavior is unconsciously determined, the doctor should not adopt a moralistic attitude toward anything the patient tells him. Even if the patient's attitudes and activities violate everything that we as individuals believe to be right and moral, the most we should do is to point out to him the effect his behavior has had upon his personality and its functioning. Members of the clergy are the ones with whom the patient should discuss moral and ethical problems. Intelligent clergymen can be of the utmost help in many treatment situations and we frequently ask their cooperation in the management of anxiety states. By the same token, an unintelligent or uninformed clergyman sometimes can do a great deal of harm. However, I am happy to say that, since the advent of lecture courses and internships in Pastoral Counseling and since there has developed a much better rapport between the clergy and the medical profession, the former have been able to help us immeasurably. Above all, we must avoid the creation of guilt reactions or the intensification of those that already exist. Guilt feelings are some of the most frequent progenitors of anxiety. "P" stands for persuasion. The patient must be persuaded to persevere in his efforts to get well, to cooperate with his physician, to attend to his physical as well as to his mental hygiene, not to rely too much upon pills and potions, and to participate in activities of which he formerly was afraid. Some years ago I<sup>6</sup> paraphrased Sir William Osler as follows: "A physician's art stands in inverse proportion to the amount of bromide he prescribes.

If the anxiety state does not respond to more or less superficial psychotherapy, a psychiatrist should then be consulted. Fortunately, this happens only in a minority of cases. However, I would caution the practitioner not to continue treating a patient if: (1) the doctor himself feels insecure, (2) the patient seems to be getting worse, (3) if suicidal tendencies appear, or (4) if the doctor doesn't have the time to see the patient regularly by appointment for a thirty- to sixty-minute interview at least once a week. Many physicians tell me that at the

prevailing fee for office calls in their areas, they cannot afford to devote that much time to a single patient. In psychiatry the fee for office interviews is determined by the amount of time spent with the patient and, in this section of the country, it varies from \$10 to \$25 per hour depending upon the psychiatrist's overhead, how busy he is, and upon his idea of his own worth.

Few psychiatrists today adhere to any single school of psychotherapy. As the psychotherapist develops experience he also develops intuitive reactions to patients and an awareness of timing, that is, when to explore certain areas or to make certain interpretations to the patient. He also develops a warm feeling toward those who are anxious, perplexed, and in trouble. The late Paul Schilder whom I knew in Vienna and who was one of the great psychotherapists, was a successful psychoanalyst who had never been analyzed himself. He was great because he loved people, had an intuitive awareness, and was eclectic. He was an outstanding neurologist, neuropathologist, neurophysiologist, and psychoanalyst. He was all of these because he was intelligent, emotionally mature, and had a penetrating insight into human nature.

Of course, it is necessary to structure treatment and to structure it along certain lines. Decision as to which psychotherapeutic technics and treatment patterns should be used in the more serious cases must rest upon the individual judgment of the psychiatrist and not be determined by his school affiliations.

### CONCLUSIONS

The purpose of this paper is not to discuss various schools of psychotherapy but to elucidate in part the following points.

1. Anxiety is a symptom depending upon a complex variety of psychologic and physiologic

processes.

- 2. Anxiety may be the result of childhood experiences and may be deep and pervasive (central anxiety) or it may be the result of superficial conflicts which can be readily identified.
  - 3. Anxiety can produce somatic symptoms.
- 4. Most cases of anxiety can be treated superficially by the general practitioner.
- 5. A few cases of anxiety require special psychiatric management.

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## Routine Chest Roentgenograms in a Rural Hospital

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In January 1952, a routine chest x-ray program was instituted in St. Gabriel's Hospital. This report was being submitted to the staff in order that they might evaluate the program, and decide whether or not its continuance is advisable.

The value of hospital admission chest roentgenograms as a public health measure has long been recognized. This group of the population naturally has a somewhat higher tuberculosis rate than the general population which contains a larger percentage of well individuals. Also, the value of routine chest x-ray films as far as protection of hospital personnel is concerned, has previously been determined in other institutions.

A problem of infection of hospital personnel in this institution was apparent to the governing body for some time, since 2 student nurses with previously negative Mantoux tests became actively infected and were sent to tuberculosis sanatoriums for treatment during the past few years.

The problem in this institution is somewhat different from the ordinary 100-bed general hospital, since the hospital is closely associated with St. Otto's Home for the Aged and with the Franciscan Convent. A tuberculosis control program was instituted at St. Otto's Home in 1950 when all residents received Mantoux tests and all who showed a positive reaction were x-rayed. Since that time, all new admissions to the home have had x-ray films taken routinely. In 1951 a similar program was started in the convent, where approximately 125 sisters are in residence. The program is now on a yearly basis, and all negative reactors receive Mantoux tests and chest roentgenograms are given to positive reactors. All employees and nurses of the hospital have been given Mantoux tests and roentgenograms annually for several years.

Discussion of the program of routine chest roentgenograms on all hospital admissions was

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started in the summer of 1951, when the report of a committee of the Minnesota State Radiological Society for Hospital Admission Chest Examination was presented to the staff of St. Gabriel's Hospital. A committee was appointed to study the possible adoption of such a program in this hospital.

The plan as adopted by the staff at a later meeting consisted of taking routine admission chest roentgenograms of all patients over 16 years of age who had not previously been so treated within a period of one year. Also, as adopted by the staff, a review was to be done at the end of one year, and the program was to be discontinued if not deemed worthwhile.

Since the capacity of this hospital is 100 beds, it seemed advisable to use the established roentgen department and to take 14 x 17 films. This procedure has been carried out. The method by which these roentgenograms are obtained is quite simple. When a patient is admitted to the floor, a request for routine chest roentgenogram is submitted to the x-ray department immediately. The film is taken as soon as possible, usually the day of admission. These films are read three days a week, since the roentgenologist is present at these times. Obviously, this method is not as desirable as that used in larger hospitals where special equipment and personnel are available and roentgenologists are present to read the films immediately.

The x-ray department, prior to this year, operated with two technicians at an overload. Since this program has been instituted, an aide has been employed to transport patients from the floor, and an additional technician has been employed to take care of the previous overload and the additional work required by the routine chest roentgenograms. Since the department is crowded, patients cannot be taken there prior to admission. If the department is enlarged, this can be done, and increased efficiency in the program will result. Daily reading of the films would also increase the value of the program.

The charge for these routine x-rays was estab-

lished at \$4. This was the minimum fee recommended by the Committee for Admission Chest X-rays of the Minnesota Radiological Society. Chest roentgenograms, if ordered by the patient's physician, were not considered to be a part of this program.

Total admissions to the hospital for the year 1952 were 6,127. The total adult admissions were 3,984. Of these, 1,941 had routine chest roentgenograms. Since x-ray films were taken only on patients over 16, this percentage has

little significance.

Table 1 states the findings of these routine films.

#### TABLE 1

Tuberculosis	
Active, confirmed, pulmonary tuberculosis	
(patients now in sanatorium)	2
Inactive tuberculosis	16
Questionable tuberculosis	31
Expired before definite diagnosis made	3
On reexamination, found to be negative	8
Still questionable	1
Not yet rechecked	19
Ghon's focus	143
Other pulmonary conditions	
Pneumonia .	31
Pulmonary congestion	18
Peribronchial infiltration and increased	
bronchovascular markings	252
Fibrosis	24
Emphysema	4
Ateleetasis	15
Histoplasmosis	7
Silicosis	1
Calcification in hilar glands	14
Pleural conditions	
Diaphragmatic adhesions	5
Inflammation of pleura	1
Thickened pleura	35
Pleural effusion (nontuberculous)	ξ
Cardiac lesions	
Enlargement	135
Mitral lesions	7
Aortic lesions	
Calcification in aortic arch	7
Tortuosity of the aorta	41
Ectasia of the aorta	4

From the above summary it is evident that a number of chest and cardiac conditions were diagnosed as a result of this program, which otherwise would not have been found. It is also true that many of the above cases would have been discovered by chest roentgenograms ordered by the physician, had the routine chest roentgenogram program not been in existence. An increase of 1,962 x-ray films taken by the department in the year 1952 over the year 1951, however, indicates that probably a good many of these 1,941 routine films would not have been taken. It is also true that 2 patients are now being treated in sanatoriums, neither of whom would probably have received roentgenograms had not the routine program been in existence.

#### SUMMARY

During the year 1952 the routine chest roentgenogram program at St. Gabriel's Hospital became a valuable public health measure in tuberculosis control in Morrison County. Also, as far as protection of hospital personnel is concerned, the value of the program has become definitely established. The routine roentgenograms have been of value to the patients.

For the above reasons your committee recommends that the program be continued in the future. As a matter of statistical convenience the committee recommends the minimum age for the program be changed from 16 to 14 years to conform to the age division between the pediatric and adult medical departments in the hospital. The committee also recommends that when additional space is available for the x-ray department, patients be x-rayed immediately upon admission to the hospital. It is also recommended that when practicable, the films be read daily.

The committee also suggests that in the event plans are made for the enlargement of the entire hospital, some study be given to the installation of necessary equipment for taking 4 x 5 photo fluorograms prior to admission of the patients. The cost to the patient would then be reduced from \$4 to about \$1.50 per film. Investigation might reveal that such a program might be more economical to the hospital. Possibly such equipment might be purchased by civic groups and placed in the hospital. Thus, x-ray equipment would be available within Morrison County which could be used in county-wide surveys and follow-up studies on tuberculous contacts. Such a step would materially increase the efficiency of the control program in Morrison County.

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This department of The Journal-Lancet is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.

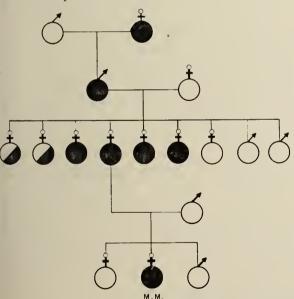
## Hereditary Spherocytosis

## Case Report with Eight Other Cases in the Same Family

GILBERT S. CAMPBELL, M.D.

Minneapolis, Minnesota

The purpose of this paper is to report an interesting family pedigree of 4 generations in which hereditary spherocytosis was present (figure 1). Of this group, 4 were subjected to splenectomy by Dr. Owen H. Wangensteen at the University of Minnesota Hospitals.



HEREDITARY SPHEROCYTOSIS, PROBABLE

HEREDITARY SPHEROCYTOSIS

) NORMAL

Fig. 1. Hereditary spherocytosis present in 4 generations.

CILBERT S. CAMPBELL, a 1946 graduate of the University of Virginia, is with the department of surgery at the University of Minnesota. He is a clinical fellow, American Cancer Society.

M. M., age 5, University Hospitals No. 860629, was admitted August 4, 1953 for an elective splenectomy. This girl became icteric and vomited her feedings 1 to 3 weeks after birth and at the age of 1 month a diagnosis of hereditary spherocytosis was made by Dr. Virgil Sydenstricker of the University of Georgia. Blood transfusions were given at 1 month and 8 months of age, but since then no further transfusions were required.

Growth and development have been normal and no crises have been noted since the age of 8 months. The high incidence of congenital hemolytic anemia in the patient's family is illustrated in figure 1. Twin maternal aunts died at 2½ years of age concomitant with a severe bout of abdominal pain and vomiting. The cause of death was probably a severe hemolytic crisis although the diagnosis is not sure. Splenectomy was performed on the patient's mother and 3 maternal aunts, and the mother and 1 of these 3 maternal aunts had a cholecystectomy for cholelithiasis. The grandfather had a cholecystectomy for cholelithiasis approximately thirty years ago but he never had a splenectomy. The great grandmother had intermittent jaundice.

Physical examination of M. M. revealed a well-developed, well-nourished, and cooperative young girl in no acute distress. Blood pressure was 100/58, pulse was 96, and respiration 18. Lungs and heart were clear to percussion and auscultation. Spleen was easily palpable with lower margin of spleen 5 cm. below costal margin. The liver edge extended 1 to 2 cm. below the right costal margin. No icterus was noted in the skin or conjunctivae. Skeletal and neurologic examinations were negative.

Hemoglobin was 10.6 gm., red blood count was 3.98 million, white blood count was 7,000 with normal differential. Spherocytosis was noted on the blood smear. Reticulocyte count was 4.6 per cent

and bleeding and clotting times were normal. Platelets were 336,000 and total serum bilirubin was 1.2 mg. per cent. Increased red blood cell fragility was noted with hemolysis beginning at 0.68 per cent NaCl and being complete at 0.38 per cent NaCl in the patient, whereas beginning and complete hemolysis in the control were 0.44 per cent NaCl and 0.32 per cent NaCl, respectively. Urine urobilinogen was 7.68 Ehrlich units per 2 to 4 PM specimens whereas the normal value is up to 1 Ehrlich unit per 2 to 4 PM specimens.

On August 5, 1953 a splenectomy was done with a weighed operative blood loss of 39 cc. The spleen weighed 205 gm. and the microscopic appearance of the spleen was characteristic of familial hemolytic anemia. Sections of the spleen showed the red pulp to be congested with blood cells, the sinusoids to be small and compressed, and normal lymphoid follicles. The postoperative course was uneventful except for the laboratory finding of a large rise in platelets with a peak of 1,054,000 platelets per cubic millimeter of blood on the ninth postoperative day. Anticoagulant therapy, heparin intravenously, was instituted on the seventh postoperative day when the platelet count reached \$76,000 and was discontinued after the eleventh postoperative day when the platelet count had fallen to 660,000. The patient was discharged on August 16, 1953 and the wound was well healed at that time, the skin sutures having been removed on the sixth postoperative day. Hemoglobin the day of discharge was 12.7 gm. and the patient had received no blood during the preoperative, operative, or postoperative period.

## DISCUSSION

The genetic trait is thought to be carried by a mendelian dominant which may be transmitted by either parent. Consequently, the offspring of those who escape the disease are free of the disease whereas children of a parent with the disease have a 50 per cent chance of having hereditary spherocytosis. As a general rule the earlier in life the disease appears the poorer the outlook and the more urgently splenectomy should be advised.

William Dameshek<sup>1</sup> states that hereditary spherocytosis is characterized by a chronic hemolytic anemia of varying severity in which spherocytosis and increased hypotonic fragility are prominent features. The chronic course of the disease is frequently punctuated by minor and major exacerbations in the intensity of the hemolytic process. The minor episodes are characterized by malaise, low grade fever, pallor, and icterus which last for several days and

#### REFERENCES

1. Dameshek, W. and Bloom, M. L.: The events in the hemolytic crisis of hereditary spherocytosis, with particular ref-

erence to the reticulocytopenia, pancytopenia and an abnormal splenic mechanism. Blood 3:1381-1410, 1948.

2. Ремвектов, J. De J.: Results of splenectomy in splenic anemia, hemolytic jaundice, and hemorrhagic purpura. Ann. Surg. 94:755-765, 1931.

then subside quickly and spontaneously. These minor exacerbations are frequently unrecognized. The major episodes may endanger life and commence as an acute febrile illness. Abdominal discomfort, pronounced pallor, dizziness, nausea, vomiting, chills, and fever are prominent features of such episodes. Diarrhea may be present with the passage of grossly bile-stained stools. Shock may occur during the height of a crisis and the spleen is often considerably enlarged and tender.

Gallbladder disease with or without stones was present in 69 per cent of 118 cases of this disease reported by Dr. John de J. Pemberton.<sup>2</sup>

Laboratory findings include a moderate anemia with a red blood count of 3 to 4 million as a general rule. However, little to severe anemia is noted. The red cells display a globular tendency and the mean diameter of the red blood cell is usually decreased with a mean diameter of 6.2 to 7.0 u. Spherocytes with a diameter as small as 4  $\mu$  have been noted and the red cells have an increased fragility when placed in sodium chloride solution of different concentrations. The increased fragility of the red blood cells is more pronounced in cell suspensions incubated at 37° C. for twenty-four hours. Reticulocyte count is usually elevated and the platelet count and white cell count are ordinarily normal. The Coombs' test is generally negative in hereditary spherocytosis whereas it is usually positive in acquired hemolytic anemia. Urobilinogen is excreted in the urine and stools in extremely elevated amounts. Bone marrow shows erythropoietic hyperplasia.

Splenectomy is the treatment of choice for this condition and preferably should not be performed during a crisis. The increased fragility of the red cells remains after the splenectomy although the anemia disappears. Actually, these spherocytic cells have been found to have an essentially normal life span when they are transfused into splenectomized individuals.3

Accessory spleens should be looked for at the time of surgery as they have been reported in as high as 57 per cent of patients.4 Dr. Robert Gross<sup>5</sup> reported 1 death in 59 splenectomies in children for this condition, and this death occurred in a child who had a cholecystectomy and common duct exploration along with the splenectomy. Anticoagulant therapy is usually recommended to prevent postsplenectomy thrombosis when the platelet count exceeds 750,000.

The over-all results of splenectomy for this condition have been most gratifying.

SCHRUMPF, C. A. A.: Role of the Spleen in Familial Spherocytosis. Proc. Third International Cong. International Soc. Hematology, New York, Grune & Stratton, 1951, page 94.
 CURTIS, G. M. and MOVITZ, D.: Surgical significance of accessory spleen. Ann. Surg. 123:276-298, 1946.
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93 E. SIXTH STREET ST. PAUL 1. MINNESOTA Textbook of Pathology, seventh edition, by E. T. Bell, M.D., 1952. Philadelphia, Pa.: Lea and Febiger, 1008 pages, \$12.00.

Medical publishers are cold, detached realists. The bar graphs of sales dictate whether a book is retired to oblivion or is perpetuated in a new edition. Bell's *Pathology* is now in its seventh edition in the life span of its author. That fact alone is salient testimony of its worth.

Many sections of the previous edition have been rewritten and considerable new material has been added. Almost 50 new photomicrographs are found in the new edition. bringing the number of illustrations to over 500. A new eolor plate showing the Gömöri stain of the normal islet eells of the panereas and the beta cell degranulation of diabetes make the histopathology of that disease more meaningful. The section on renal pathology is probably the finest treatment of this topic in any standard text.

E. T. Bell's Textbook of Pathology achieves the twofold objective of demonstrating to the student that pathology is not an isolated subject and that elinical medicine is an extension of pathological studies. This book can be unreservedly recommended to the medical student and to the student of

medicine.

DENNIS J. KANE, Ph.D.

Surgical Forum; Proceedings of the Forum Sessions, Thirty-seventh Clinical Congress of the American College of Surgeons, San Franeisco, California, 1951, \$10.00.

This is a most stimulating volume. The import of this book is revealed in the statement by Owen H. Wangensteen, chairman, Surgical Forum Committee, in the foreword, "The shift of emphasis in the scientific programs of the Clinical Congress from the earpentry of surgery to the chemistry and physiology of surgery has set in motion a chain reaction, influences of which have already been felt amongst surgeons, but some end-effects of this action upon surgery probably will continue to be felt in far away places and in future years."

This volume is a collection of 140 articles and abstracts of investigative work being performed on various surgical subjects in the surgical laboratories and clinics of this country. The surgical frontiers are being extended by the works reported by



these investigators. A fuller understanding of the fundamental physiologic and chemical knowledge of surgical problems is being established by these investigative procedures.

The papers deal with many phases of the surgical field. The papers are precise and many are well illustrated. The subjects are grouped under the following sections: the lungs and esophagus, the stomach and spleen, the intestines, the liver and portal system, the heart, blood vascular system and blood flow, the urogenital tract, neurophysiology and neurosurgery, orthopedics, repair and regeneration, the endocrines, body fluid and electrolyte, and blood volume and shoek.

Ernest R. Anderson, M.D.

Injury of the Xiphoid, by Michael Burman and Samuel E. Sinberg, 1952. New York: Columbia University Press, 92 pages, 17 illustrations. \$3.50.

This monograph eonsists of a eomplete bibliography and 7 chapters on xiphoid ailments. The latter include congenital variations, primary and secondary diseases, traumatic injuries, and finally an analytic summary of symptoms and signs. This treatment of the xiphoid is exhaustive

H. R. SNIDER, M.D.

Synopsis of Genitourinary Disease, by Austin I. Dodson and Donald L. Gilbert, 1952. St. Louis: C. V. Mosby Company, fifth edition, 298 pages, 122 illustrations, \$4.00.

In brief and coneise form, Dodson and Gilbert present an outline of genitourinary diagnosis and treatment aimed primarily for use by medical students and general practitioners. Surgical problems and specialized diagnostic procedures are defined and described very briefly. Emphasis is placed on the more common lesions of the genitourinary

system that might be encountered in an average practice.

The authors commence their work with a review of methods of diagnosis from simple clinical histories and examinations to basic cystoscopic principles. Sections of particular value to medical praetitioners are those dealing with urethral instrumentation, irrigations, instillations, minor operative technics, and prostatic massages. A new feature in this edition is a brief review of newer methods of ehemotherapeutic and antibiotic therapy of genitourinary infections.

Concisely discussed are anatomic considerations, congenital anomalies, urogenital tubereulosis, injuries, urinary ealculi, hydronephrosis, obstruction at the vesical neek and problems ereated by this lesion, neurogenic vesical dysfunction, urogenital tumors, and elinical aspects of hydrocele, varicocele and spermatocele. A large section of the book is devoted to various nontubereulous infections of the upper and low-er urinary tracts and genital systems. The eonsiderations are always of basic principles, and much space is devoted to technies of sounding, dilating, massaging, and irrigating with various antiseptie solutions. Minor surgical procedures are frequently mentioned.

The book is well prepared and printed in large, easily read type. It is a worthwhile addition to the library of anyone interested in urologie problems. Drs. Dodson and Gilbert state in the preface that their book is "to present the recognized principles of the practice of urology." They have achieved this goal.

W. E. PRICE, M.D.

History and Development of Neurological Surgery, by Ernest Sachs,, M.D., 1952. Paul B. Hoeber, Ine., 158 pages, \$5.00. This delightful little book will be prized by all neurosurgeons, all historians of medicine, all neurologists, and many students of prehistoric man. There is a fine chapter on the trephining of skulls which was practiced thousands of years ago by neolithic peoples in several parts of the world.

The book is beautifully illustrated, and all neurosurgeons will be happy to have pietures of the men who contributed so much to the development of their subject.

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## American College Health Association News . . .

We announce with pleasure that the Executive Committee has approved the applications for membership of the following two institutions:

San Diego State College, California, with a total cnrollment of 4,077 day students. The Health Service, whose director is Dr. Frank O. Robertson, is staffed by 1 full time and 6 part time physicians, 2 nurses, and a full time medical secretary and a part time assistant. Clinical psychologists are available for counselling and technicians are furnished by medical technology majors in their senior year as needed. Health examinations are given to new students on entrance, to returning students, and to students seeking examinations voluntarily if the physician feels they are indicated. The Student Personnel Council meets twice a month and the director of Health Service is a member of this group. All problems of student welfare are handled directly or indirectly by this group.

University of Miami at Coral Gables, Florida, has a total enrollment of 10,318 students, including the evening division. The Physical Services department is in charge of Dr. Kenneth E. Snyder and consists of 1 full time and 1 part time physician, a part time psychiatrist, 10 full time and 1 part time nurses, and 1 sanitarian. Health examinations are given to new students on entrance. This is the first year of the reorganization of the health service, and some changes will probably be made as time goes on.

The Rocky Mountain Section held its annual meeting on December 5, 1953, at the University of Denver. L. Barbato, M.D., director of Health Service at the University of Denver, presided.

The University of Southern California played host to the Pacific Coast Section, which held its 17th annual meeting at the Statler Hotel in Los Angeles on December 4 and 5, 1953. Gilbert S. Coltrin, M.D., of the Associated Colleges at Claremont presided.

Communicable diseases this fall continue to be very few in number at the University of Florida, according to Dr. Sanford E. Ayers' monthly report of the student health department. Aside from the usual respiratory infections, the main problem from the standpoint of time lost by students from infectious diseases, has been due to a considerable number of cases of infectious mononucleosis.

Final tabulation of the x-ray surveys conducted in August and September reveal the following positive findings:

Active tuberculosis	2 cases
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Heart disease	
Other types of chest pathology	47 cases



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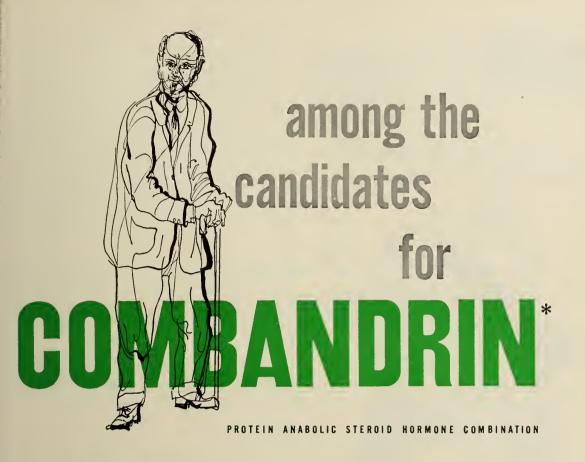
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Kountz, W. B.: Ann. Int. Med. 35:1055, 1951.

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## News Briefs . . .

## North Dakota

A NEW FEE schedule for medical care of persons on North Dakota public assistance rolls has been approved by the State Public Welfare Board. The new schedule represents a moderate increase from the schedule the board has held with the medical association since 1943.

APPROXIMATELY 700 persons attended open house at Mercy Hospital in Williston following dedication of the new addition to the hospital. The bed capacity of this 33-year-old institution is now increased to about 100 beds. Construction of the new addition was begun July 1952.

Harvey Medical center observed the first anniversary of its service to the people of Harvey and the surrounding communities on December 19, 1953. During the past year, over 21,000 patients have been treated at the Center. The Harvey Center, with its competent staff and modern facilities, has been a boon to residents of the town and surrounding area.

Dr. Robert M. Russell, who served for two years with the United States Air Force and practiced medicine with the Florida State Department of Health for four years, is now associated with Dr. K. P. Malvey and Dr. R. O. Johnson at Bottineau.

## Minnesota

The spacious, modern, well-equipped clinic at Coon Rapids, which opened December 7, is already serving a large area. At present the clinic is served by Dr. M. K. Plasha, physician and surgeon, and Dr. Melvin W. Elk, dental surgeon. If practice warrants, another physician will probably join the clinic within the next year. Dr. Plasha and Dr. Elk watched the swiftly growing community for over five years and decided the territory would be an excellent area to serve.

DR CHARLES W. MAYO, famed surgeon and governor of the Mayo Clinic, urged doctors and scientists to work for adoption of President Eisenhower's plan for a United Nations "atomic bank." Dr. Mayo believes that if the plan could be made a reality, the trend of conquering disease would be greatly accelerated throughout the world.

DR. IRVINE McQUARRIE, professor and head of the pediatric department at the University of Minnesota, was one of 10 recipients of the 1954 Modern Medicine award for distinguished achievement. Dr. McQuarrie received the award for his contributions to the understanding of metabolic disturbances in children.

Dr. Justus Ohage has been named president of the Minnesota State Medical Association and assumed office January 1. Dr. Ohage is the third doctor in the history of the organization to follow his father as president of the group. The others were Dr. W. J. Mayo and Dr. C. H. Mayo.

(Continued on page 73)

## South Dakota

THE KIMBALL CLINIC, a new out-patient clinic, has been established at Kimball by Dr. Erich P. Voss. The latest medical and surgical equipment will be installed. Ample parking space is to be provided, and building alterations are expected to be completed in 1954.

Combined efforts of the citizens of Lake Norden and Dr. Romans Auskaps, a displaced Latvian physician, were responsible for construction of the Lake Norden Clinic. The area is now provided with the medical service it so badly lacked for eight years. The sum of \$13,000 for construction of the clinic was raised in thirteen hours. The building was erected in six weeks and contains a reception room, laboratory, x-ray room, two examining rooms, and a room for a dentist. Much of the labor for the construction was donated.

SOPHOMORE medical students at the University of South Dakota topped other second-year medical students throughout the nation last spring in an achievement test on cancer. The test is designed to discover the level of knowledge concerning cancer that medical students have each year of their four-year course of the study.

DR. H. P. Volin has completed forty years of service to the people of Lennox. After graduating from Northwestern University, Dr. Volin studied diseases of the eye, ear, nose, and throat in London for about a year. Since start of his practice in Lennox in 1914, he estimates he has delivered more than 3,000 babies.

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MEDICINE—Two Week Intensive Course starting May 3.
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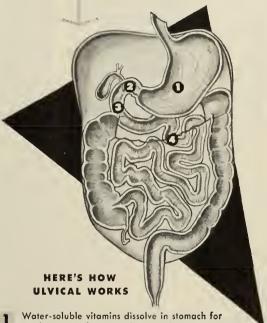
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DAVID B. HORNER, M.D.

Minot, North Dakota

THE pigeon-toed child has been described by Kite<sup>1</sup> as one with one-third of a clubfoot. This deformity constitutes a much neglected and important orthopedic problem. Despite the fact that this condition is increasing, as Kite has stated, only 6 articles have appeared on the subject in American literature since 1933. Children with this affliction often report for treatment after considerable delay. In our experience, many parents and physicians, too, entertain the idea that the child will outgrow the trouble. This misconception gains added significance in view of the fact that as many as 1 per cent of adults are so afflicted according to an estimate by Scott and Hutter<sup>2</sup> and also because the deformity is best corrected early in infancy with prevention of the anatomic, physiologic, and psychologic sequelae which are so distressing in later life.

Considerable dispute has existed among authors in regard to nomenclature. However, fundamentally, metatarsus adductovarus has been divided into 2 major groups by earlier workers and this serves as a good practical subdivision.

Metatarsus varus is the most severe form of this lesion (figure 1), and is characterized by adduction of the forefoot with associated supination. Roentgenologic examination demonstrates the metatarsals to be adducted and superimposed. Their shafts are curved with a dorso-

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lateral convexity. In addition, an associated varus rotation of the cuneiform bones may be present.

Metatarsus adductus is a more common deformity and consists of only adduction of the forefoot (figure 2).

Kite has pointed out that, in the severe cases, there is usually an associated valgus deformity of the heel that is absent in the milder forms, and that no deformity of the hindfoot, as seen in a clubfoot, is present. The significance of this fact will be reviewed in regard to treatment.

#### PATHOLOGY

Fundamentally the deformity is one of muscle imbalance of unknown etiology and of congenital origin. In addition to the bony deformity previously described, Peabody and Muro<sup>3</sup> have described an abnormal attachment of the tibialis anterior muscle into the plantar fascia or the mesial portion of the transverse metatarsal ligament.

## REVIEW OF CASES

In the period of 1949 to 1952, 56 cases of metatarsus adductus were seen in the orthopedic section of the Northwest Clinic. Of these, 12 have been eliminated from this analysis because of failure of the patient to return for complete treatment or to be seen for adequate reexamination.

The remaining 44 cases are reviewed in this paper. Of this number, 20 were males and 24 females. Ages ranged from four days to six years,

with an average age of approximately eleven months.

The deformity was unilateral 11 times, involving the right and left sides 7 and 4 times respectively.

Associated valgus deformity of the heel was

present in 7 cases.

Associated congenital abnormalities involving other areas of the body occurred in 9 instances, consisting of rickets, dysplasia of one hip, osteogenesis imperfecta, and hydrocele. There were 2 occurrences of associated equinovarus elubfoot on the opposite side and 3 of associated inguinal hernias.

#### TREATMENT

No uniform opinion regarding the best methods for managing these patients appears in the literature. One group states that management can best be carried out by primarily eonservative methods with operative surgery reserved by another group for the late, severe cases. The majority of older authors recommend that forcible correction be done under anesthesia. The policy of the orthopedic section of the Northwest Clinic has been to follow the teachings of Kite by utilizing progressive methods of wedging of the forefoot. This method will be discussed here. We believe that most deformities of metatarsus varus can be corrected if the fundamental concepts of gentleness, persistence, and attention to

detail are observed. Metatarsus adductus in a 6-week-old female prior to correction can be seen in figure 3. Figure 4 shows the same child after treatment with wedging plasters and retainer cast.

Of the 44 cases described, 6 were regarded as mild enough to be corrected by simple manipulation performed by the mother. These patients were followed carefully and all of them obtained complete correction over a period of one year. Treatment for the remainder consisted of wedging plasters, the first cast being applied upon the initial examination and marked for lateral wedging of the foot. These children are seen at weekly intervals at which time Kite's method of correction by wedging is employed and the plaster reapplied in the wedged position. Wedging is carried out on each cast on 2 occasions, making a total immobilization period of three weeks in any individual cast. The latter is then removed, the foot is examined, and, if complete improvement is not noted, a new series of similar wedging plasters is again applied. As in the management of clubfoot, great attention to soft tissue detail and adequate protection of the soft parts are of utmost importance. Care must be taken not to produce any wrinkles in the plaster or direct pressure over bony prominences. Other fundamental difficulties incurred by this method as compared to that used in clubfoot are:



Fig. 1. An 18-month-old child showing severe metatarsus varus with deformity of metatarsal shafts.



Fig. 2. Child, age 3 years and 2 months. Parents had been advised that the child would outgrow the deformity. It was corrected by a series of wedged plaster casts to overcorrection. Follow-up after two years revealed excellent results.

- 1. Attention must be paid to the fact that since no equinus deformity is noted here, the casts must be applied in neutral position rather than in the equinus position utilized in the management of clubfoot.
- 2. Care must be taken to protect the neutral position of the heel; otherwise wedging is likely to exaggerate the valgus distortion of the heel.

If this latter precaution is not observed, pressure will inevitably produce an increased valgus distortion of the posterior portion of the foot with yielding in the posterior joints. The resultant flatfoot might be worse than the original deformity. The casts are reapplied until the foot is in the overcorrected position. When this has been accomplished, the foot is then maintained



Fig. 3. Metatarsus adductus in a 6-week-old female prior to correction.



Fig. 4. Same child as in figure 3 after treatment with 2 wedging plasters and retainer cast.



Fig. 5. White female who was 5 days old when treatment was started. A series of 2 wedging plasters and 2 retainer casts were used. Each cast was left on for three weeks.

in the overcorrected position by a retainer plaster cast which is applied without change for three weeks (figures 5 and 6). It is then removed and overcorrection is maintained by the mother

who is instructed how to perform the necessary manipulation.

A review of the remaining group in this series reveals that correction can be accomplished in



Fig. 6. Same patient as seen in figure 5 one year after treatment.

children up to 6 years of age by means of a series of 2 casts and an additional retainer cast. Correction has been verified in all instances in this series by follow-up examinations. If, at this time, as already noted in 7 cases, minimal recurrence did take place, a repeat series of similar wedging plasters was carried out. Roentgen examination should demonstrate that the metatarsals are now parallel and in the correct position.

This method of conservative management has proved highly successful in our hands. We have not observed any of the severely deformed feet with tendon alteration as described by Peabody.

#### SUMMARY

Forty-four cases of metatarsus adductovarus are presented and their conservative management discussed. Emphasis is placed upon the fact that this anomaly is increasing in frequency and severity in this country and that failure to correct it in infancy leads inevitably to the more radical methods for management of the resulting flatfoot and bunion in later years. A plea, therefore, is made to avoid these sequelae by regarding a pigeon-toed deformity in the earlier years of life as one which will not correct itself spontaneously. Treatment should consist of gentle manipulative reduction and wedging plasters.

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COSTOCHONDRAL underdevelopment causing atelectasis of the newborn may be successfully treated by sternal traction. For infants manifesting cyanosis and retraction of the chest wall, William G. Love, Jr., M.D., and Bert Tillery, M.D., of Columbus, Georgia, find that the procedure induces sufficiently high negative intrathoracic pressures to overcome the cohesion of the moist alveolar surfaces of the lungs. The skin and fascia overlying the lower end of the sternum are caught with a towel clip and traction is applied by small rubber bands, the clip handle being attached to the top of the incubator. Additional clips may be used to control reaction, if necessary.

WILLIAM G. LOVE, JR., and BERT TILLERY: Am. J. Dis. Child. 86:423-425, 1953.

## Infant Food Allergy

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HYPERSENSITIVITY to food during infancy is a controversial subject. A review of the literature tends to confuse rather than clarify the issue. Food allergy in infants is defined as any reaction produced by the ingestion of uncontaminated food which can be alleviated by eliminating the suspected food or foods and reproduced at will by refeeding.

In an attempt to clarify our own thinking on this subject, we have analyzed 1,000 consecutive case records of infants seen in a private pediat-

ric practice in suburban Minneapolis.

Of these 1,000 infants, 383 had proved allergic reactions to food. This figure is undoubtedly higher than a similar analysis in many offices would reveal, because we see many infants known to be allergic who are not under routine care in our office. However, it does indicate that allergic reactions to food during the first year of life are not at all uncommon. Unfortunately, no pathognomonic signs or symptoms appear in most allergic reactions during the first year of life, so the diagnosis must be one of exclusion. This is readily appreciated when the most common food allergy reactions are listed: colic, eczema, excessive vomiting or spitting, and diarrhea. A list of the rare and questionable reactions will further emphasize the point: rhinitis, asthma, constipation, excessive mucus, failure to gain weight, urticaria, purpura, and unhappy babies.<sup>1</sup>

A positive family history is traditionally an important consideration in establishing the diagnosis. Table 1 shows the division of allergic manifestations correlated with the heritage pat-

tern.

The 619 total allergic reactions in these 383 allergic infants also indicates that many of these infants had multiple reactions involving different shock organs.

A typical case history illustrates this point. A five-month-old baby girl when first seen had a history of colic for two months, diarrhea with

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failure to gain weight for one month, and an early atopic eczema which was steadily getting worse. All of these symptoms promptly disappeared when the offending foods were removed from the diet.

TABLE 1

	Bilateral family history	Unilateral family history	Negative family his- tory or unknown	Total
Eczema	70	158	112	340
Colic	44	82	54	180
Diarrhea	16	12	8	36
Rhinitis		6	4	10
Excessive vomiting.	6	8	8	22
Asthma	4	4	4	12
Constipation	2	4	2	8
Urticaria		2		2
Excessive mucus	2			2
Purpura	1		2	3
Failure to gain weight	4			4
Total rea	ctions			619

The figures under bilateral family history are lower than they would have been if prophylactic dietary management had not been instituted at birth in known allergic families.<sup>2</sup> In many instances, if several older children in the family had previously developed allergic reactions, the most common allergens, cow's milk, wheat, citrus, and eggs were never fed to the new baby during the first months.

The negative family history or unknown history column in table 1 reveals possibly a higher proportion of cases because of the many adopted babies whose family history was unknown, or because parents did not know allergic back-

grounds existed.

However, even when these known inaccuracies are taken into consideration, these figures indicate that a positive family history of allergy is not essential in establishing a diagnosis, although when present is very helpful.

Soy bean milk product used was Mull-Soy, furnished by the Borden Company. The age of onset of the most common allergic reactions to food is often helpful in establishing a diagnosis (table 2).

TABLE 2

	Average age in weeks	Variation in weeks
Excessive vomiting or spitting	5.1	2–12
Colic	5.5	1-44
Eczema	9.3	1-44
Diarrhea	. 10.3	1-44
Rhinitis	. 26.0	24 - 52
Asthma	. 32.0	24-44

Thus colic and excessive vomiting or "spitting up" tend to occur in the early weeks, while rhinitis and asthma usually appear in older infants. Many cases of the early reactors, with colic or vomiting, later develop eczema. The later reactions can almost invariably be prevented during the first year if a prophylactic

regimen is followed.

The definition of infant food allergy gives the clue to the most simple and most accurate diagnostic tool, the elimination diet. The elimination diet must be individualized for each infant. The foods eliminated are determined primarily by the age of the infant and the dietary history correlated with the appearance of symptoms. Usually this is quite simple in very young infants because they are being fed few different foods. The most common offenders during the first few months of life are cow's milk, wheat, citrus juice, egg, and vitamin preparations. When the dietary history reveals that symptoms developed shortly after the introduction of a new food, the elimination of that particular food is often all that is necessary to cure the symptoms. The problem of deciding which foods to eliminate becomes more difficult in older infants who take a greater variety of foods and particularly those whose symptoms have been present for many weeks.

If the working diagnosis of food allergy is correct and if the elimination diet is sufficiently restricted, improvement can be expected within a few days, often quite dramatically within

twenty-four hours.

If no improvement occurs within one week, two conclusions are justifiable. First, the working diagnosis of food allergy was in error, or, second, the elimination diet was not sufficiently restricted.

Sometimes a very simple elimination diet involving only one or two foods must be used. When this is necessary, we prefer soy bean milk alone for infants under six months of age, and

soy bean milk plus lamb for older infants whose appetites will not be satisfied on a liquid diet alone. These two foods are used because we have found them to be the least allergenic for most infants.

The diagnosis is never established until refeeding of the suspected foods reproduces the

original symptoms.

Other diagnostic technics are rarely necessary. Some that have been advocated by various authors have merit, especially as research tools, but are impractical and too expensive for routine use in private practice. Special mention should be made of the cutaneous skin tests for foods in infants under one year of age because of their popularity. We have never found it essential to rely on skin tests in infants. In fact, those we have done were more often misleading than helpful.

#### MANAGEMENT

Once the diagnosis is established, other foods can be quite rapidly added. Of course, the common allergens, wheat, egg, cow's milk, and citrus fruits should be avoided. For vitamins, one of the multiple, water-soluble drop dosage preparations which include synthetic vitamin A and D is preferred. We have yet to see an allergic infant who could not be fed an adequate diet for normal growth and still remain symptom-free.<sup>3</sup>

#### BREAST FED INFANTS

In the total group of allergic infants, 78 were fortunate enough to be breast fed. In this situation, the principle of the elimination diet is applied to the mother's food intake by removing or severely restricting the most common allergens. Wheat is limited to 1 serving a day and milk is reduced to 1 pint. Citrus fruit and juice, chocolate, eggs, and nuts are eliminated. By this simple technic alone, 58 mothers were able to continue breast feeding until their infants were five or six months old. The relief of symptoms after instituting this regimen was quite dramatic in many cases. Often relief occurred within twenty-four hours; the longest period of time was two weeks.

After relief of symptoms the mothers were instructed to add foods to their diet slowly. Many of them reported only 1 or 2 foods caused difficulty each time they were ingested. We also had reports that pears, green beans, and cucumbers when reintroduced into the mother's diet caused a return of allergic reactions in the baby.

These breast fed infants were given soy bean milk as a relief bottle. Many of them, after be-

ing weaned from breast feeding at five or six months, still had proved cow's milk allergy.

The 20 babies we could not control on the above regimen, which was given up after one or two weeks if unsuccessful, showed very rapid improvement when breast milk was discontinued. They all had cow's milk reactions and were raised on soy bean milk. Some of these babies could be controlled, but only by restricting the diet to the point of nutritional inadequacy for the mother. Some mothers were not willing to be on a restricted diet at all and requested change to formula.

#### ARTIFICIALLY FED INFANTS

In artificially fed babies, cow's milk is the most common food allergen and is followed in frequency by wheat, citrus fruits, vitamin products, and eggs.

Table 3 shows the various foods to which the infants in this series showed allergic reactions. The figures for wheat, eggs, and citrus fruits would have been much higher except that after a diagnosis of food allergy is established, a prophylactic dietary regimen is instituted which excludes these foods during the first year.

TABLE 3

	Meats
Cow's milk	Veal 10
Vitamin products 48	Beef 6
Eggs 42	Lamb 4
	Chicken 2
Cereals	Liver 2
Wheat 60	Pork 2
Oats	Tunafish 2
Barley 6	
	Fruits
Corn 6	Peaches
Rice 4	Apples 34
	Oranges 32
Vegetables	Bananas 28
Yellow	Pears 26
Peas 32	Lemons 20
Beans 24	Prunes 16
Spinach 16	Apricots
Tomatoes 12	Pineapples 10
Beets 8	Grape juice 2

Two important conclusions can be drawn from these figures. First, food allergies in infancy are almost always multiple. Second, no infant food is universally nonallergenic. Some of the figures in the above table are misleading. The yellow vegetables, carrots, squash, and sweet potatoes, seem at first glance to be potent allergens. However, experience finds them to be the least potent of the vegetables. The high figures are accounted for by the fact that we routinely add

the yellow vegetables before trying the green vegetables. The low incidence of reactions to the green vegetables is accounted for by their prophylactic climination from the diet until the later months of the first year when most allergic infants begin to lose their hypersensitivity to all foods. The explanation for the low incidence of reactions to the citrus juices is the same. That is, they were seldom tried until the later months because of their known potency in causing allergic reactions in very young infants.

Of the 208 infants with cow's milk allergy, all were first tricd on soy bean milk. Table 4 shows the results.

### TABLE 4

## Use of Soy Bean Milk

Age started
2 weeks to 8 months
Average age – 9.1 weeks
Time before relief of symptoms
Immediately to 1 month
Average – 1.7 weeks
Age discontinued
3 months to 2 years
Average – 8 months
Length of time on soy bean milk
1 month to 20 months
Average – 5.6 months

#### Soy Bean Milk Failures

40 failures

14 cases of eczema

10 cases of colic

8 cases of colic and eczema

2 cases of colic and vomiting

2 cases of eczema, vomiting, and failure to gain weight

2 cases of eczema, vomiting, and diarrhea

2 cases of asthma

20 cases cleared up on meat formula<sup>4</sup>

16 cases tolerated boiled evaporated milk

4 cases responded to a proprietary hypoallergenic

Use of soy bean milk as cow's milk replacement successfully managed 80 per cent of cow's milk allergies. Of the 40 cases proved to be allergic to soy bean milk, 20 cleared up on meat formula, 4 responded to a proprietary hypoallergenic formula, and 16 tolerated boiled evaporated milk formulas.

This table also shows that cow's milk allergies are almost never permanent when properly managed. Often they are of very short duration when cow's milk and other common food allergens are eliminated early in life.

As soon as a nonallergenic formula is established, other foods can be added quite rapidly until the diet becomes nutritionally adequate.

Management of these infants with food aller-

gies entails careful detailed instructions to the mothers and frequent follow-up reports. Many common errors are made by intelligent and cooperative mothers unless this procedure is followed. A few examples emphasize how important it is for parents and physicians to carefully read the fine print on labels. Strained pears are often packed with "lemon juice." Apricots are sometimes packed with "farina" which, of course, is wheat. Mixed vegetables, meat and vegetable mixtures, and soups frequently contain wheat flour, and tomato. Puddings and custards contain milk and eggs. Rye bread usually contains wheat.

The dietary management of these cases is basic.<sup>5</sup> However, in long-standing or complicated cases, symptomatic management must also be used. A detailed discussion of the dermatologic management of eczema is beyond the scope of this paper. Suffice it to say that as the years have passed the number of preparations used on these damaged skins has steadily decreased. At present, Burow's solution 1:16 packs for the weeping stage, and a mild 1 or 2 per cent stainless tar ointment in a water-soluble base are about the only two used routinely. ACTH and cortisone are rarely, if ever, necessary in infant allergy management. The use of antihistamine drugs has been disappointing.

Sedation is essential in advanced cases. Occasionally vomiting or diarrhea needs correction of fluid balance by parenteral fluids. An occasional asthma reaction needs immediate transient help with bronchodilator drugs. Except for these few situations, dietary management alone is usually all that is necessary.

## SUMMARY

- 1. Consecutive case records of 1,000 infants were analyzed for allergic reactions.
- 2. Proved allergic reactions to food occurred
- 3. Diagnostic and management regimen are presented.

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RATE of growth can be improved and urinary ammonia and dermatitis reduced in infants by administering methionine supplement. The amount in standard formulas, 350 to 400 mg. daily for the first three months of life, may be increased 50 per cent, finds Louis S. Goldstein, M.D., of Professional Hospital, Yonkers, New York. Weight was gained most rapidly by 20 infants given an additional 180 mg, of the racemic type for twenty-eight days. In 10 infants, addition of 360 mg. caused diuresis and obviously impaired growth, while 50 subjects receiving 90 mg. gained at ordinary rates.

Louis S. Goldstein: Arch. Pediat. 70:285-293, 1953.

# Healthful Housing for College and University Students\*

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 $\mathbf{I}^{\scriptscriptstyle N}$  giving consideration to the significance of the quality of housing and its relation to the incidence of disease or the health status of the individual, we are in no way being original. In fact, the origin of the present concept of public health is possibly an offshoot of concern for the housing of the working classes. At least interest in hygienic housing and public health occurred concurrently. One of the earliest and most effective investigations of the subject was a report prepared by Edwin Chadwick in 1842 on "Sanitary Conditions of the Laboring Population of Great Britain." Chadwick's work stimulated similar studies in this country, and in New York City the first tenement house legislation was introduced as early as 1856. The concept of the relationship of overcrowding, poor ventilation, dampness, and filth to the incidence of disease persisted until the 1880's. With the advent of the bacteriologic era, however, and the demonstration of direct transmission of disease as a result of personal contact, Chadwick's etiologic theories became less and less accepted.

Interest in the problem of healthful housing has been reawakened in the last decade so that today an extended bibliography can be prepared listing reports of investigations of the relationship of poor housing and health. These references give accounts of the increased incidence of such diseases as pneumonia, tuberculosis, and rheumatic fever as well as of home accidents and mental illnesses due to poor housing.

Actually, while a direct "cause and effect" relationship is difficult to show, a vicious circle can be demonstrated, the beginning and end of which cannot be determined. Wherever ill health and substandard housing are found together, the additional conditions of low economic status, unfavorable working environment, low level of education, inadequate recreational facilities, ra-

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cial discrimination, and prolonged and expensive medical care are found to be a part of the picture. Who is to say whether illness necessitated living in low rent substandard housing, or whether bad housing further contributed to the status of ill health, thus lowering the economic resources of the family and necessitating occupancy of even worse housing?

In discussing the many ramifications of the relationship of public health and housing, sometimes studies made in the field of animal husbandry are enlightening! Edith Wood has done this in a publication entitled "Introduction to Housing." She quotes:

Farmers' Bulletin No. 1393. "The stabling of animals in dark, poorly ventilated, damp barns affects their health and helps to spread tuberculosis among the stock whenever the germs are present."

Farmers' Bulletin No. 1487. Practical Hog Houses: "Proper housing is an important factor in the successful raising of hogs. If little pigs are to get the right kind of a start in life, they must have plenty of sunshine."

Farmers' Bulletin No. 1554. Poultry Houses and Fixtures: "Growing chicks and laying hens need comfortable houses that are dry and roomy, with plenty of fresh air and sunlight. It never pays to overcrowd them. The houses in which chicks are brooded and reared should be constructed as to promote the most efficient growth in the chicks."

It seems sufficient to say, "what is necessary for livestock should be necessary for humans too." If human beings were housed under conditions meeting the requirements for shelter of livestock and poultry, we would have essentially satisfactory housing.

The fact that university students may be poorly housed and thus affect their health was dramatically illustrated by an experience that occurred in the University of Minnesota Students' Health Service. A student stopped at the dispensary desk and explained that for the past six weeks or more he had been suffering each day from symptoms of nausea, headache, and dizziness. His wife and her mother had also experienced similar complaints. He asked for

<sup>&</sup>lt;sup>o</sup>Paper presented at the Fifth Annual Conference of National Association of College and University Housing Officers, Minneapolis, August 2 to 5, 1953.

assistance because his wife and baby were due home from the hospital. He was particularly concerned about possible danger for the infant. Since the entire family was ill, the physician thought that the student's environment might be responsible and referred him to the department of environmental health in the Students' Health Service.

The student and his family lived in a small, one-room, shack-like structure on the banks of the Mississippi River. A gas heater and a converted gas refrigerator were among the household equipment being used. Since we suspected carbon monoxide poisoning, we called on the Industrial Hygiene Division of the State Department of Health for assistance. An engineer from that office and a sanitarian from our office visited the student's home. Tests for carbon monoxide showed that the air throughout the oneroom house contained concentrations two or three times the allowable maximum.

The mother-in-law, who was quite ill at the time, was told to shut off the refrigerator and to keep the windows open. The father was told to leave the baby in the hospital until the gas company regulated the refrigerator. Because of the several public health problems, contacts were made with the City Health Department and its Public Health Nursing Service for help to handle the situation.

If the situation had not been investigated and the infant had been taken home, the windows probably would have been closed to keep the building warm for the infant. The result might have meant loss of life of the infant, the student, his wife, and mother-in-law.

This situation is interesting because it substantiates the need for certain standards and requirements in regard to suitable housing for students.

Assuming that there is a relationship between housing and personal health, what then are the basic requirements for healthful housing? The Committee on the Hygiene of Housing of the American Public Health Association has pioneered in the development of standards which serve as a yardstick for evaluating the quality of housing. One of the earlier publications of the committee formulating the basic health needs of housing is entitled "Basic Principles of Healthful Housing,2 and includes some 30 basic principles together with the specific requirements and suggested methods of attainment for each. These needs are considered the fundamental minimum requirements for promotion of physical, mental, and social health and are divided under the following headings:

1. Fundamental physiologic needs. Included are the areas of thermal environment, chemical purity of the air, natural and artificial illumination, noise, and space requirements for exercise and play.

2. Fundamental psychologic needs. Reference is made to privacy for the individual, opportunities for normal family and community life, provision of facilities for performance of household tasks, maintenance of cleanliness standards, and esthetic and social needs.

3. Protection against contagion. Needs are discussed for provision of a safe water supply, sanitary plumbing and adequate waste disposal facilities, exclusion of vermin, refrigeration, and space requirements for sleeping rooms.

4. Protection against accidents. Included are safe construction, fire prevention and fire safety, elimination of electrical hazards and danger of gas poisoning, protection against falls and mechanical injuries in the home, and safety in the neighborhood.

The Students' Health Service has found the philosophy of these basic concepts to be adequate in defining the scope and requirements of its inspection program for student dwellings. Emphasis is placed upon the fact that the usual standards found in the typical building code and housing ordinance cannot be interpreted literally as minimum standards for student housing, although every attempt should be made to adhere to such legal standards as closely as possible. Most of our statutory requirements do not consider the way in which student occupancy places rather unusual demands on housing. For the student, his dwelling unit is his workshop, his place for recreation and relaxation, as well as his sleeping room.

The quality of housing provided for the students of the University of Minnesota has been a responsibility of the university's administration for many years. The present policy dates from an action taken by the board of regents on November 5, 1932, at which time it was voted to

approve the following regulation:

"Students, whether graduate or under-graduate, while attending the University, must have their places of residence approved by the proper authorities of the University. If in the opinion of the Board of Regents or its representatives the conditions at any such place are not conducive to study, health, or morals, it may, at its discretion, insist that students vacate such residence and occupy rooms that are approved by the Board."

In 1938-39 the present procedure of inspecting

and grading rooming houses and other student dwelling units was put into effect.

Two additional official regulations have added to the scope as well as the authoritative basis for the program. On June 1, 1950, the Committee on Student Affairs of the University Senate adopted the following policy:

"Residential student organizations and their alumni corporations contemplating the modification of existing property, or the purchase, or the building of new facilities, shall make an appointment for consultation at the Office of the Dean of Students. Actual purchase of property, construction of new quarters, and commissary and structural remodeling shall proceed only after this consultation.

"The Office of the Dean of Students shall arrange for the consultation meeting with the president of the student organization; a representative or representatives of the alumni corporation, if any; the Student Activities Bureau's advisor to the organization; the financial advisor to student organizations; a representative of the Health Service; and other service agencies of the University which may be appropriate."

This, in effect, provides for technical assistance by the Students' Health Service to student organizations purchasing housing units, planning new construction, or remodeling of chapter buildings.

On February 9, 1951, the board of regents adopted a sanitary code for the university. This code establishes standards for environmental health and sanitation considered necessary for the reasonable protection of health and safety for university students and staff. It designates the Students' Health Service as the official health department for the university responsible for the inspection and enforcement of all provisions of the code. In addition to sections on water supply, food sanitation, swimming pools, and so forth, a section is entitled "Student Housing" which reads as follows: "All student housing, including dormitories, fraternities, sororities, cooperatives, and student occupied rooms in privately owned residences, is to be inspected in accordance with accepted standards for sanitation and safety. Compliance with such minimum standards as may be designated shall be a requirement for approval of student housing by the proper authorities of the University."

The administration of the housing policy of the university as established by the board of regents in 1932 is the responsibility of the Housing Bureau in the office of the dean of students.

That part of the housing program concerned

with sanitation and safety of student housing has been delegated to the Students' Health Service on the basis of the technical assistance, in the area of environmental health, available from the public health engineering and sanitation staff in the Health Service.

The Student Activities Bureau has joint responsibility with the Health Service in carrying out those regulations adopted by the Senate Committee on Student Affairs relating to the housing operated by officially recognized student organizations.

The operation and management of university dormitories is administered through the department of service enterprises, since the dormitories are self-supporting units.

The procedures in the Students' Health Service, for the supervision of student housing may be outlined as follows:

- 1. Off campus rooming houses and apartments. At the request of the Housing Bureau, inspections are made of every private dwelling in which a university student is rooming unless such dwelling is owned or rented by the student as a complete structure, or unless the student is living with immediate relatives. This includes sleeping rooms throughout the Twin City area, converted apartments, and apartment houses in which students are renting complete units. Also, through the Housing Bureau a consultation service is provided to householders planning to buy or remodel units intended for student housing.
- 2. Fraternities, sororities, and cooperatives. Inspections are made of every fraternity, sorority, cooperative, or religious foundation providing housing for students. The Health Service also reviews and approves plans drawn by architects and engineers for construction of new chapter houses, or for alterations to existing chapter houses. In addition, a consulting service is provided for all student organizations planning to purchase existing properties. This includes an inspection of the property and a report to the organization outlining the deficiencies and limitations as well as the improvements needed to make the structure suitable for occupancy by the organization.

An important part of the supervision of such housing units is the routine inspection of the food service. This includes review and approval of plans for new food service facilities or alterations to existing facilities. Experience has demonstrated the need for close supervision of this phase of the housing program for student organizations.

3. University dormitories and cooperatives. Routine inspections are made of university owned and operated cooperatives, university dormitories, and the food services operated in these facilities. A consulting service reviewing plans for new dormitories, for new food services, or for alterations and improvements to existing food services is available to the various university departments such as the physical plant department and the department of service enterprises.

An analysis of the distribution of student enrollment in the various types of housing serves to indicate the percentage and number of students for whose housing the Health Service has responsibility. For example, data made available by the Student Housing Bureau for 1951-52 shows that 43 per cent of the enrollment on the Minneapolis and St. Paul campus is housed at home. Nearly 2,300 students live in dormitories; about 1,100 live in fraternities and sororities; 1,900 live in apartments; and approximately 2,300 live in rooming houses. This means that for the year 1951-52 approximately 50 per cent of the total enrollment lived in housing units subject to Health Service inspection.

In 1952-53, over 1,200 inspections were completed requiring over 1,700 visits to the dwelling units. During the peak postwar enrollment, from 1,500 to 2,000 inspections were made each year requiring 2,500 to 3,000 visits.

The standards used in determining the quality of student housing are guided by the basic principles of healthful housing. In addition, the Health Service attempts to interpret and apply the rules and regulations of the some eight or nine official agencies having jurisdiction in the Twin City area in which the program functions. An excellent working relationship is maintained with these agencies. The program is coordinated with the official agency programs to such an extent that whenever Health Service recommendations are questioned, the householder, student organization, or university official who questions them is advised to communicate with the official agency in order to confirm the basis for the recommendation.

In making surveys, whether in a dormitory, fraternity, student cooperative, or privately owned student rooming house, an inspection form is used which includes information on the general characteristics of the structure as a whole, detailed information on the student dwelling unit, on bathrooms and toilets, basement and furnace rooms, and a separate section on general accident and fire prevention. The form includes a

weighted point system which serves as a basis for scoring the combined structure and dwelling on an alphabetical basis.

Individual dwelling units or entire structures may be disapproved for student occupancy either on the basis of an over-all low score, indicating a general state of deterioration, or on the basis of specific violations of fire department or buildnig code regulations which are considered to be a real hazard to the safety of the student. In addition, there may be dual ratings where a third floor or cellar, for example, will be disapproved, while first and second floor rooms may be approved.

At the time of the inspection recommendations are made to the householder. These recommendations, together with the Health Service rating, are reported to the Housing Bureau. A follow-up on these recommendations is made by the Housing Bureau during subsequent routine contacts with the householder.

Considering only the inspection of privately owned rooming houses and buildings converted to provide housekeeping or apartment units, a review of the inspection reports for 473 units, made up of 348 rooming houses and 125 converted apartments, gives the following information about the quality of such housing. Fuses larger than the 15 amperes intended for house circuits were being used in 38 per cent of the buildings. This, of course, is characteristic of student occupancy because many additional electrical appliances are used by the student in his room, consequently overloading the circuit and introducing a serious fire hazard. Extension cords in 28 per cent of the units were either in poor repair or improperly used. A sufficient number of wall outlets were lacking in 29 per cent of the units, or were overloaded with fixtures. Hazards existed in 13 per cent of the units because of appliance installations in bathrooms, faulty installation of other appliances, or electric shock hazards in or around laundry facilities.

Of special importance is the fact that 29 per cent of the units had unsafe stairways, either lacking handrails or being improperly lighted. Inadequate egress was found in 10 per cent of the units, either improperly located or non-existent.

Recommendation for installation of an approved type of fire extinguisher was made in 61 per cent of the cases. In 10 per cent of the situations, reservicing of existing extinguishers was recommended.

A summary of the 104 disapprovals of student

housing units for the period September 1, 1952 through June, 1953 is included in table 1. This is the same period covered in the previous data but includes additional housing.

TABLE 1 SUMMARY OF DISAPPROVALS—SEPTEMBER 1, 1952 THROUGH JUNE, 1953

1.	Third floor housekeeping	24
	Third floor sleeping, lack of adequate egress	26
3.	Second floor housekeeping without adequate	
	means of egress	28
	Cellar occupancy	15
5.	Gas appliances in sleeping rooms	2
6.	General condition of house	6
7.	Room size inadequate	2
8.	Gas appliance in closet	1
	Total	104

In summary, it is reasonable to ask about the net effect of such a program concerned with healthful housing of the students at the University of Minnesota. Conceding again the difficulty of showing a direct "cause and effect" relationship between housing and health, nevertheless, this program shows concrete evidence of accomplishment from past efforts.

For example, many improvements are known to be made either to correct a disapproved rating or to comply with recommendations in order to improve the grade of the house. These include construction of new fire escapes, remodeling of exits to fire escapes, installation of additional wiring circuits, additional wall outlets, elimination of gas appliances, and correction of other conditions, such as accumulations of combustibles, poor housekeeping, old or deteriorated plumbing fixtures, improved lighting, new beds, additional storage facilities, and so forth.

If a dwelling unit is disapproved for student occupancy, the student must vacate the unit. The problem of such units being reoccupied does arise, but a special effort is made by both the Housing Bureau and the Health Service to keep a close check on known disapproved units.

As a consultant to householders and to student organizations, the Students' Health Service is able to assist and participate from the beginning in plans for remodeling or expansion of facilities. Since 1950 an opportunity has arisen in at least 60 per cent of the student organization chapter houses to review architectural and engineering

plans for major work. To be able to add worthwhile recommendations to plans being made has been a satisfying experience.

Much of the off-campus housing is in an area bounded by heavy industry. Residential housing might have a real tendency to deteriorate if it were not for the benefits of the university, and the constant effort of the university housing agencies to improve the standards of housing in the area. In addition to sanitation and safety, the programs appeal to the householder with regard to general housekeeping, interior and exterior decoration, as well as upkeep of the general premises.

Less tangible, but still of real significance, is the education that the householder and the student receive concerning hygienic and safe housing. Householders and students are made aware of the standards for good housing. As students graduate and go into their own communities and acquire civic responsibilities, they will, perhaps, have some additional interest in housing and a conscientiousness regarding the enforcement of housing codes.

As for the future, that this student housing program is not as complete as it might be is well recognized. For example, both students and householder can profit if descriptive literature about good lighting is made available and additional technical information provided to enable the householder to provide not only enough light, but light of good quality.

The need for a continuing service to provide healthful housing for students is apparent. An active period of construction and remodeling among student organizations has occurred and will probably continue. Turnover of householders is constant, and the new owners place greater demands on the program as they take on the assignment of providing housing for students. Housing officers will continue to have all the problems of old, deteriorated, and converted structures operated for student occupancy under the control of private owners.

These inherent characteristics of student housing combined with the obvious housing problems arising from the anticipated increases in enrollment will continue to present a challenge to both Student Housing and Student Health Service officials. This challenge requires resourcefulness, energy, and ingenuity.

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## A New Treatment for Pruritus Ani

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A most annoying minor disease, which every physician is called on to treat, is pruritus ani. The etiology of the condition is shrouded in verbose mystery. The lack of a good and simple treatment is camouflaged by a multiplicity of so-called cures, such as innumerable ointments, various operations, radiotherapy, and diet.

During the course of cortisone therapy for other conditions, I was impressed by the symptomatic relief obtained by patients with chronic pruritus ani. Stimulated by this observation, and feeling that an internist may occasionally contribute to dermatology,1 an ointment was made of 2 cc. (50 mg.) of cortisone suspension with enough aqueous base to make a total of 1 oz. This ointment has been used since April 1952 with promising, palliative results, objectively as well as symptomatically, in about 70 per cent of the patients. In cases which appear to have an element of infection, suitable ointments have been used additionally, such as bacitracin, polymyxin, and Desenex. The hard, glazed, varnish-like coating found in advanced cases must be removed by suitable softening ointments.

The cortisone ointment has purposely been used on some of the more stubborn cases, which previously received competent and accepted therapy with disappointing results. Recently an article on the use of parenteral ACTH has appeared.<sup>2</sup> This article made me feel that the results with the ointment should be published, since a local medication has many obvious advantages. A few typical classes of case histories are given.

Cancerphobia patient with pruritus ani: Mr. S. D., No. 29422, a 50-year-old business executive was a highly nervous individual with spells of hyperventilation. He had suffered from increasing pruritus ani for four years. The onset dated from a rectal operation at which time several polyps were removed, the significance of which was understood by the patient. After the operation the patient's attention became focused on his rectum which he scratched more and more, particularly on retiring. He consulted several physicians, including a

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dermatologist, without obtaining much relief. No x-ray treatment or surgery had been used on the pruritus.

The anus presented the usual red, boggy, cracked, and scratched appearance, being about a grade 2 condition. Cortisone ointment was prescribed to be used 4 to 6 times daily. Within two weeks the scratch marks were almost gone, the edema had largely subsided, and the color was fading. Itching had nearly disappeared and the patient was able to go to sleep more quickly.

Allergic patient with pruritus ani: Mrs. J. G., No. 29020, a 41-year-old housewife had been subject to attacks of pruritus ani for three years. The condition occurred mainly in the warm months, but was much worse during the ragweed season when her hay fever

was at its height.

In previous years, some relief was obtained by the use of orally administered antihistamines and various analgesic ointments applied topically. This year, both the itching and the hay fever became unbearable. Examination revealed a grade 1 to 2 pruritus. Sigmoid-oscopy showed no other pronounced anorectal pathology.

The patient was given 100 mg, of cortisone orally followed by 25 mg, every six hours for forty-eight hours. At the end of this time the hay fever was much relieved and the anal pruritus was considerably lessened. However, in another forty-eight hours the pruritus had become very annoying. The local use of the ointment 4 to 6 times daily brought about a complete remission of the difficulty within one week. Since that time, occasional applications have successfully combated any slight recurrences.

Patient with surgical anorectal disease with pruritus ani: Mr. T. M., No. 26536, a 49-year-old business executive was first seen in November 1946. This patient had suffered from very severe pruritus ani with multiple fissures of the anus for four years. He had had 2 minor operations for the fissures. In December a competent proctologist did a radical operation on the anorectal area and extensive undercutting of the skin.

By March 1947, the pruritus began to recur and the patient saw a series of dermatologists. Many ointments were prescribed and a series of x-ray treatments were given. The amount of pruritus varied, but the condition persisted until April 1952.

The perianal area was raw, red, and marked with scratches. At this time cortisone ointment was prescribed. Relief was remarkable and within two weeks the patient was better than he had been in years.

However, he did not continue treatment faithfully. The condition recurred and a hard, glazed, thickened covering formed. Softening ointments were necessary to remove this crust before the cortisone ointment could afford relief.

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# Stigmonene Bromide in the Treatment of Muscular Spasm\*

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Muscle spasm, which may be a necessary and beneficial means of splinting a joint after acute injury and inflammation, may, in the chronic stage, become the major factor in disability by restricting motion and causing pain.<sup>9</sup>

The mechanism of spasm lies in the shortening of the skeletal muscles which usually appears in the acute stage and may persist for long periods of time. The early stages of muscle spasm have the following characteristics: prominence of tendons, flatness and narrowing of the muscle belly, increase or decrease in number and depth of skin folds or creases, limitation of the range of passive joint motion, and other evidences of muscle shortening with pain on stretching or pressure.10 Kabat has said that nervemuscle dysfunction is frequently a major factor in the disability in chronic rheumatoid arthritis and following various types of trauma, as well as in spastic paralysis of neurological origin."

Therefore, according to the concept of Kabat and Knapp,<sup>10</sup> spasm is neurogenic in origin. The impulses "through reflex arcs as well as from the higher centers, including the pyramidal tracts, must be relayed through the internuncial neurons to excite the larger motor neurons in the anterior horn."<sup>11</sup>

Harell and his associates,<sup>7</sup> in somewhat similar terms, have likewise stated that muscle spasm is a phenomenon of muscular contraction mediated through the central nervous system. According to them, "various types of stimuli are transmitted, by way of reflex arcs (figure 1) and their associated internuncial pools and the final common path, to the effector organ, in this case, the muscle."

In other words, any lesion arising in the inter-

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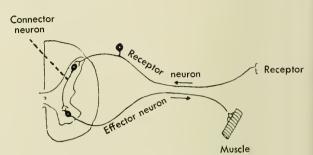


Fig. 1. Diagram of a simple reflex arc.

nuncial area can disorganize the synaptic transmission to the anterior horn cells. Muscular hypertonus and proprioceptive reflex hyperirritability is usually the end result of this synaptic disorganization.

Harell's group has further pointed out that, "spasm in skeletal muscle is a reversible state of sustained, involuntary contraction." This is the reversible state which gives us the optimistic feeling that a way will be found to relieve the patient of pain by overcoming the spasm.

Neuronuscular dysfunction, therefore, appears to play a rather important role in most chronic muscle and joint disabilities such as rheumatoid arthritis or related disorders — the end effect being the extremely painful spasm of muscle. This lack of muscular relaxation over a period of months or years usually means a loss of function, limitation of joint movement, or deformities. The hyperirritability produced tends also to delimit the passive range of motion.

In the past few years, many investigators have reported on the value of the cholinergic drugs for the relief and control of muscle spasm. In both the acute or chronic stages of neuromuscular disorders, muscle spasm has been accepted as one of the basic factors of pain.

Whether one is an exponent of the electrical theory of Nachmanson or the chemical theory

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Stigmonene Bromide made available by Warner-Chilcott Laboratories.

of Dale and Loewi in nerve mediation, consensus of opinion is that acetylcholine is the basic element of nervous activity. We know that physostigmine or other cholinergic drugs have the ability to inhibit the action of cholinesterase, which inhibition, in turn, permits the accumulation of more than normal amounts of acetylcholine at the synapses, parasympathetic nerve endings, and at the neuromuscular junctions. Therefore, their use in muscle spasm should demonstrate a muscle-strengthening effect through improving the synaptic organization. Several authors believe that the action of neostigmine or its related cholinergic compounds on the internuncial cells in the spinal cord increases the transmission of the inhibitory impulse causing a relaxing action on skeletal muscle. 13,15,17 Many workers confirm the basic thought behind this hypothesis by reporting striking improvement or encouraging results in many cases involving muscle spasm. 1-4, 6, 9-11, 14,18,20

This consideration aroused our interest in a new cholinergic compound, Stigmonene Bromide, when we learned that, unlike neostigmine, the drug was of extremely low toxicity with a fairly wide margin of therapeutic safety.<sup>5,8,19</sup> Since safety, in addition to effectiveness, is among the most important virtues of a good drug, we felt that Stigmonene Bromide warranted a clinical trial in our outpatient depart-

Both animal and pharmacologic studies demonstrated that cholinergic drugs act as inhibitors of the enzyme cholinesterase and as parasympathetic stimulants.<sup>12</sup> This work was able to be reproduced in the case of Stigmonene. 16 Experimental investigations also demonstrated that Stigmonene Bromide was less toxic than drugs of the physostigmine group with the added factor of being free from undesirable side effects on the cardiovascular system, the pupil, and the sweat and salivary glands. Animal experimentation with the drug in comparative doses to neostigmine was not as effective on the skeletal musculature - slightly larger doses being necessary to elicit a similar response. Its lower toxicity should make possible broader and safer usage over longer periods of time.

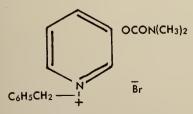


Fig. 2. Stigmonene Bromide.

Chemically, Stigmonene Bromide (figure 2) is a synthetic alkaloid-like salt of the quaternary pyridinium series. It has a molecular weight of 337.23. It is a white, crystalline solid with a melting point of about 115 to  $117^{\circ}$  C., soluble and stable in alcohol and water. The pH of a 1 per cent aqueous solution is 4.5.

Therefore, the purpose of our investigation has been, first, to evaluate clinically the effectiveness of Stigmonene Bromide in the various arthritides and allied conditions, and, second, to establish an effective dosage schedule.

## CLINICAL MATERIAL

The entire study embraced 76 patients and was executed in two parts. All cases selected had rheumatoid arthritis or similarly related conditions, predominantly osteoarthritis and chronic rheumatoid arthritis. Diagnosis was based on careful history, clinical examination, complete blood count and erythrocyte sedimentation rate, and x-ray data together with any consultation considered necessary. They exhibited a maximum of deformity and definite loss of function and limitation of motion. An attempt was made to include only patients in whom spasm was a prominent sign. Spasm was demonstrable chiefly by pain on palpation and motion and limitation of movement. Treatment of these patients prior to their inclusion in this study consisted of all of the conventional methods used in therapy at this arthritis clinic. Among the measures employed were the administration of salicylates, neostigmine, vaccines, hormones, physical therapy, and weight reduction. Neither ACTH nor cortisone had been used.

## PROCEDURE — GROUP I

In addition to careful examination and laboratory tests, and before Stigmonene therapy was instituted, the affected joints of the individuals in both groups were also measured to determine the amount and degree of deformities and range of joint motion. However, possible inaccuracies encountered in making objective determinations of range of motion on a group of patients of this type should be mentioned. For example, a certain angle of flexion at the elbow may be measured, while by simply compressing the instrument further into the soft tissue an entirely different reading may be obtained; or, by an extra effort, the degree of flexion may be increased although no improvement really exists. Consequently only major increases of motion were considered significant. Diminution of pain was found to be the best criterion of improvement, and we felt sure that these patients would recognize even a slight change of this nature.

Initially, Stigmonenc Bromide was administered parenterally in 1 cc. doses of 0.5 mg. (1:2000) twice weekly. This individual dosage was gradually increased and eventually doubled. In the early days of the study, 0.4 mg. of atropine sulfate was given to each patient. This atropine tablet was to be taken by mouth only if and when unusual gastrointestinal side effects, such as abdominal discomfort, diarrhea, and so forth, occurred. If no untoward effects developed, the atropine was disregarded until the dosage of Stigmonene was increased. The administration of atropine was again set aside when it became obvious that the patient was able to tolerate the increased dosage. In the case of any individual with a history of severe arterial hypertension or coronary sclerosis, a special effort was made to keep this patient under close scrutiny. Observations on the status of patients were made each month in an attempt to determine what type of effect was induced by the administration of Stigmonene Bromide.

#### DISCUSSION OF GROUP 1

A total of 42 arthritic patients were treated with Stigmonene twice weekly and observed over a period of four months. Of these, 17 were males and 25 were females. Age groups coincide with the large number of cases of osteoarthritis and advanced rheumatoid arthritis (table 1). The dosage administered intramuscularly ranged from 0.5 mg. to 1 mg.

TABLE 1 NUMBER OF CASES: 42 (17 MALES, 25 FEMALES)

Age groups:		
Under 40 years		 1
40 to 49		4
50 to 59		9
60 to 69		 18
70 to 79		6
Over 80		1
Types of diseases:		
Osteoarthritis		29
Rheumatoid arthritis		8
Osteo-rheumatoid		2
Gout		1
Arthralgia		 1
Traumatie-myositis		1

However, only 21 of the 42 patients are included in the analysis because they received sustained and nearly uninterrupted treatment for at least six weeks. The remaining 21 patients are not discussed because they neglected to appear regularly in the clinic. The results are given in table 2.

Of these 21 patients, 2 showed much improvement. Motion was almost unlimited and pain

 $\begin{array}{c} {\rm TABLE~2} \\ {\rm STIGMONENE} \ \ {\rm THERAPY-DOSAGE~SCHEDULE} \\ 0.5\ {\rm TO~1~MG./CC.} \end{array}$ 

Improved	
Range of motion unlimited and no pain	2
Range of motion increase and pain decrease	2
Range of motion increase and pain increase	7
Temporary	1
Unimproved	
Range of motion and pain unchanged	9
Total	
10tat.	. 21

had disappeared. Both of these individuals had pathology in the spine. In 2 other instances, increase in motion and decrease in pain were demonstrable.

Definite evidence of increased range of motion with, however, increased pain was observed in 7 patients. Why this apparent paradox should exist is difficult to determine, but probably relaxation of the spasm permitted a wider range of motion of an inflamed joint which in turn caused pain. Only temporary improvement occurred in 1 case. In 9 individuals the condition remained unchanged. Therefore, a beneficial effect appears to have been obtained by 12 patients. However, the dosage range was felt to be inadequate and a further increase was indicated. Side effects appear to be minimal despite the fact that many of the patients had arteriosclerosis, including heart disease.

## PROCEDURE — GROUP II

Having demonstrated conclusively that there were few side effects from the injections of 0.5 to 1 mg. of Stigmonene, larger doses were believed to be safe even in the presence of serious complications such as severe heart disease and hypertension. The participants in the second phase of the study numbered 34 (table 3).

TABLE 3 NUMBER OF CASES: 34 (17 MALES, 17 FEMALES)

Age groups:		
Under 40 years		3
40 to 49		4
50 to 59		5
60 to 69		14
70 to 79	, .	6
Over 80		2
Types of diseases:		
Osteoarthritis		
Rheumatoid arthritis		5
Arthralgia		1
Osteoporosis		1

The initial dosage of 2 mg. per cc. administered twice weekly was rapidly increased so that at the end of the second week the full dose of 3 mg. per cc. was being given. Atropine was

Improved	Maintenance
Range of motion unlimited and no pain	Of range of motion increase and pain decrease 11
Range of motion increase and pain decrease 16	Improvement of range of motion and pain decrease 1°
Temporary	Relapse 6
Unimproved	Unimproved
Range of motion and pain unchanged 16	Range of motion and pain unchanged 16
Total34	Total

<sup>\*</sup>Patient had improved temporarily on Stigmonene.

given at the start to counteract any adverse effect on the gastrointestinal tract, but was soon found to be unnecessary. The patients were under treatment for ten weeks and were observed at regular intervals. As in the first part of the study, simple objective determinations of improvement were made, but most reliance was placed upon the patient's statements of his general condition, particularly increase in the range of motion and diminution in pain. At the end of this ten-week period, the same patients were given 1 cc. of sterile saline solution under circumstances similar to the Stigmonene injections under pretense of continuing the same medication. After the ten-week course with this placebo, 9 patients with a particularly refractory type of arthritic disability were given a series of daily injections of 4 mg. of Stigmonene for seven days.

#### DISCUSSION OF GROUP 11

The results of the observations are found in table 4. During the ten weeks of Stigmonene therapy, a total of 18 patients appeared to have obtained a beneficial effect, although benefit was only temporary in 1 patient. Of these, 11 maintained that improvement through the next ten weeks when the placebo was substituted for the active drug. The patient who obtained only temporary improvement from Stigmonene improved again on the saline injections. In 6 patients, the original symptoms promptly reappeared when the placebo was substituted for Stigmonene. It was difficult to determine whether the remission induced was sufficient to carry the patient through the control period, whether the placebo induced the remission, or whether the effect of the better mental attitude improved the condi-

Of the 9 particularly refractory patients who received the short but intensified course, 4 improved with range of motion and a decrease in pain. The other 5 patients remained unchanged.

## SIDE EFFECTS

Side effects were remarkably infrequent (table 5). Special note was made of any unusual symp-

tom developing during the course of therapy with the idea of determining whether or not this was a toxic manifestation of the drug. Abdominal distress occurred in 2 cases, which undoubtedly was a drug effect and promptly relieved by atropine. Paresthesia, limited to the upper extremities, was noted in 3 patients. Because of the pronounced degree of discomfort, this condition also was listed as a drug manifestation. Weakness and fatigue of the lower extremities were present in 5 patients, which appeared to be in excess of that ordinarily encountered in a chronic disease. Aggravation of preexisting arthritis occurred in 2 patients, and 1 showed syncope. The latter symptom took place after too great a lapse of time to be considered a side effect. The total number of side effects, including those considered questionable, were 13, after more than 2,500 intramuscular injections of Stigmonene Bromide.

## ILLUSTRATED CASES

Case T. R., age 72, female with rheumatoid arthritis of six years duration. At present she has almost complete fixation of right and left metacarpophalangeal joints and interphalangeal joints with a 25 per cent loss of extension in both elbows. X-ray films reveal advanced arthritis in the left shoulder with bony atrophy. She was maintained on Stigmonene for nine months with gradually increasing doses including the short concentrated course of 4 mg. once a day at the end of the program. She felt worse. Pain in all joints had increased and motion became more restricted.

Case N. Z., male, 62, with diagnosis of calcific tendinitis of the left shoulder and hypertrophic arthritis of the metacarpophalangeal joints of right hand. Patient was given small doses of Stigmonene for six months with no improvement. When 3-mg, doses were given, rapid improvement was noted with flexion of right hand increasing to 100 per cent which previously had been limited to 35 per cent. Pain also decreased in the left

TABLE 5

SIDE REACTIONS	
Abdominal distress	2
Paresthesia	
Muscular weakness	5
Aggravation of arthritis	2
Syncope	1

shoulder. One week after instituting control study, pain recurred in left shoulder and both ankles.

Case S. H., 62-year-old male with osteoarthritis of the cervical spine. Pain and disability continued throughout the entire course of Stigmonene and control.

#### SUMMARY AND CONCLUSIONS

The efficacy of Stigmonene Bromide was evaluated in 64 patients with voluntary muscle spasm associated with rheumatoid arthritis and allied conditions. Using a dosage schedule of from 0.5 to 4 mg. twice weekly, 53.1 per cent of patients experienced considerable relief.

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## Psychodynamic Aspects of Migraine:

## A Review

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THE migraine syndrome has been recognized for several centuries. According to Lennox,<sup>1</sup> Aretaeus in the second century, writers in the Middle Ages, and Willis in the 17th Century describe such headaches. Hereditary, allergic, and psychogenic factors have been reported. As early as 1873 the importance of emotional factors in precipitation of the attacks was recognized by Liveing,<sup>2</sup> and in 1924 Moersch<sup>3</sup> reported that migrainous make-up tended to predispose to hysterical disturbances and to increased susceptibility to depressions at the menopause. In 1934 Touraine and Draper<sup>4</sup> reported 50 cases composed of 37 females and 13 males and found several factors to be significant. These patients were of a constitutional type, having acromegaloid features, outstanding IQ, and retarded emotional structure. Individually each had a characteristic repetitive pattern for occurrence of the headache. A tendency for frequent repetition in families was present, but may have been due to imitation as much as to constitutional predisposition. The onset of the first headache often involved the loss of home protection in both men and women. Arrested psychosexual adjustment existed and conflict between the desire to escape from mother and the compulsion not to leave her. The syndrome was regarded as comparable to any other neurosis. In 1935 Knopf<sup>5</sup> reported on 22 female and 8 male cases and listed their personality traits as: goody-goody type, very ambitious, reserved, repressed, dignified, sensitive, domineering, resentful, and humorless. Genital phase of adjustment was incomplète and the precipitating events in these patients were similar to precipitating circumstances in other neuroses. Fromm-Reichmann<sup>6</sup> reported 8 cases in 1937 and commented on the unresolved ambivalence in these people. She said that such persons repressed

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hostility which they could not tolerate, and converted this hostility into headache. The headache represented destruction of intelligence of loved ones and also mental castration.

H. G. Wolff's book<sup>7</sup> sums up in detail the personality characteristics of migrainous individuals and their reactions to life situations. In childhood his subjects tended to be sober, polite, and well-mannered but also showed contrasting behavior, as, for example, docility with stubbornness or inflexibility. In adolescence, these individuals were more than usually preoccupied with moralistic and ethical problems and disappointed with their contemporaries who were not. As adults they were ambitious, meticulous, efficient, perfectionistic, exacting, and conservative. Minor deviations from their set standards in their associates or themselves might bring about extreme anger. To express anger threatened their desire to be well regarded. Often between attacks they disregarded common sense limits with regard to sleep, work, and pursuit of goals. Their social relationships were marked by a desire to be well thought of but at the same time a need to be in a dominant position. The precipitation of individual attacks of migraine seemed based on a pattern of anxiety resulting from concern regarding family, financial, and personal security plus sustained striving and tension without reward. Dynamically, these people developed a rigid pattern for dealing with insecurity and anxiety in early childhood. Evidence of hatred of the parents was shown, and the child often felt delicate and unattractive. The rigidity of the character structure is based on anxiety and experience that a given system achieves results, even though at a high cost. Any change or threat to security greatly threatens the patient and makes him resentful. The life pattern of perfection, ambition, and achievement brings the patient some admiration, but for the most part more responsibility and little love. This pattern tends to build up further resentment which becomes the setting for migraine in persons so predisposed.

This paper is a review of the American and

English literature concerning the psychologic aspects of migraine since the publication of Wolff's book.

#### REVIEW OF THE LITERATURE

Since 1948, several papers discuss personality characteristics and psychogenic factors without reporting specific case material. G. A. Wolf<sup>8</sup> describes these patients as ambitious, hard-driving people who set high standards of performance for themselves and others. They may exhibit mildly compulsive behavior and possess a strong need for perfection in their daily lives. He says there are innumerable circumstances associated with migraine but believes frustration precipitates the headachc - though many times the headaches occur during periods of apparent relaxation. Mackay<sup>9</sup> observes that these patients frequently have high intelligence, quick perception, and intense emotional reactions; they are conscientiously devoted to duty, sensitive to the opinion of others, and tend to doubt their own abilities. Persons with the constitutional tendency often suffer attacks when subjected to conflicting emotional attitudes, such as a need to compromise standards in the face of excessive demands for work, or the need to express hostility despite a need for approval. Huttner<sup>10</sup> says the dominant personality features are feelings of insecurity with tension manifested by inflexibility, conscientiousness, meticulousness, perfectionism, and resentment which date back to early childhood.

Furmanski<sup>11</sup> reporting on 65 females and 35 males finds that such patients consistently possessed pronounced narcissistic traits as well as strongly developed aggressive feelings. Lack of parental affection or strictness of training frustrated these needs and produced ambivalence. He regards migraine as a physiologic vasomotor manifestation of suppressed or repressed hostility, initially directed specifically toward the family and later to frustration in general. He says the attack begins when hostilities are beyond the patient's frustration tolerance.

Sperling<sup>12</sup> reporting on 14 adults, 9 females, 5 males, and 9 children, regards the patients as orally-fixated and believes they are closely related to the other oral types, the depressions, and impulse-ridden states. Anal-sadism was strongly developed in the patients and coped with by reaction formations, rather than sublimations. None of the adults had attained a genital level of libidinal development and all the patients were regarded as highly narcissistic. Injury to the patient's narcissism produced rage which was frustrated and led to the production

of headache. Attack upon the head is regarded as an expedient and primitive way of killing.

Bostock<sup>13</sup> discusses his own migraine and the multiple treatments he received until he tried the suggestion of a medical colleague who never had headaches after learning to swear. Bostock believes that migraine is the commonest type of headache. The chief causal factor is a conflict of ideas and emotions from which the sufferer cannot escape — the so-called "trap" situation. A familial tendency seems to be present which may be genetic but is more likely to come from adverse familial environment. He believes many of life's experiences produce trap situations, the most common one being inability to express hostility. The "constant of neural energy hypothesis" formulated by Bostock in 1931 is used to explain that in a "trap" situation the same amount of energy must serve several emotional thinking patterns. In a sensitive individual, headache is the result. Psychotherapy is considered to be the treatment of choice.

In a study of 16 females and 4 males, sustained emotional tension is given as the principal determinant of the migraine attack by Kaldegg, Davys, and O'Neill.<sup>14</sup> Resentment, compulsive overactivity, and "multiple causes" were listed as sources of tension. No common personality pattern was found, but the majority were serious, competent, and practical. IQ as measured by the Wechsler-Bellevue scale showed about one-half of the group with scores between 106 and 120, one-quarter above, and one-quarter below this range. No uniform pattern was found in the Rorschach responses, but most patients showed their emotional life to be dominated by rational control.

Though most authors seem to stress the importance of hostile or aggressive feelings in the migraine patient, 2 recent case reports suggest that dependency feelings may be important in certain cases. Malloy<sup>15</sup> reports the case of a 35year-old female in whom he believes abnormal dependency produced the resentment that precipitated the headaches. Similarly, Friedman and Brenner<sup>16</sup> report the case of a 42-year-old man in whom headache was not always precipitated by conflict over unconscious hostility. Rather, the main conflict concerned an unconscious wish to remain dependent and also probably an unconscious fear of competition with his father. These latter authors suggest that a variety of conflicts may cause migraine and in an earlier publication<sup>17</sup> conclude that very often suppressed or unconscious resentment or anger are found in such patients. However, they list

a variety of other mechanisms to be of possible etiologic importance: hysterical identification, conversion reaction, satisfaction of a need for punishment, hypochondrias of psychotic type, secondary gain, and so forth.

The present authors<sup>18</sup> reported a case of migraine syndrome in a 35-year-old woman in whom hostility and unsatisfied dependency feelings were significant. In addition, the personality of her husband was of etiologic importance.

Coleman<sup>19</sup> reports a 32-year-old British Army veteran who developed migraine after head injury and subsequently showed psychopathic behavior. Though he does not directly associate the two conditions in time, he does indicate that when things went badly for the patient and he lacked security, both the headaches and the psychopathic behavior became conspicuous.

Gans<sup>20</sup> regards migraine as a special form of neurasthenia and says that the only difference is that migraine has headache as the overshadowing symptom. He points out several "similarities" between the two syndromes and suggests excessive sleep as a cause. In another paper,21 he recommends "sleep rationing" as a form of treatment.

Hay<sup>22</sup> reports 6 cases and discusses two conceptions which have proved valuable in understanding migraine patients: (1) The attack originates from a motor activity or psychomotor activity which is greater than normal and which is not balanced by adequate motor and psychomotor relaxation. Thus, no regular rhythm of alternating rest and activity is present - an essential feature of higher life. (2) The patients show a tendency to be obsessional in their thinking. They also are conscientious, sensitive to criticism or to ideas of personal failure. In contrast to Gans, Hay recommends deep sleep and rest periods after meals as part of the treatment.

Katz, Friedman, and Gisolfi<sup>23</sup> discuss psychologic factors in 15 children with migraine. In 12, evidence of neurotic symptomatology was present. In 3 cases, adjustment was apparently adequate. Other neurotic symptomatology was obvious and included temper tantrums, phobias, frequent nightmares, enuresis, and so forth. Psychodynamics were said to vary considerably.

In the past five years we found only two reports dealing with the experimental production

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of headache. In one study, Lustman<sup>24</sup> described the precipitation of headaches by hypnotically regressing patients to incidents which produce rage. Such headaches could only be produced in 3 neurotic patients who had headache as a chief symptom and not in 8 other neurotic patients. He postulates that chronic headache involves internalized feelings of rage. In another article, Marcussen and Wolff<sup>25</sup> report the experimental induction of typical attacks in 2 individuals when confronted with situations producing anger and frustration.

#### SUMMARY AND CONCLUSIONS

1. Earlier reports on the migraine syndrome tended to give characteristic personality descriptions. Recent literature also contains descriptions of personality characteristics, but is increasingly more concerned with psychodynamic factors, particularly precipitating mechanisms and underlying conflicts.

2. A review of the American and English literature of the past five years reveals the following pertinent findings: (a) Obsessive-compulsive traits are frequently reported in individuals who have migraine. Sensitivity, insecurity, and narcissism are less commonly reported. (b) The opinions concerning precipitating factors fall into three groups: (1) those in whom nonspecific tensions or frustrations immediately precede the attack; (2) those in whom hostility is regarded as the trigger mechanism; and (3) those in whom unmet or aroused dependency needs are considered the principal determinant. (c). The underlying conflicts reported can likewise be placed in three corresponding groups: (1) nonspecific or multiple conflicts; (2) unexpressed hostile feelings; and (3) unmet dependency needs.

3. The impression is gained from reading the various reports that hostility often is the immediate trigger mechanism, but that several underlying conflicts may arouse the hostility. This concept might be formulated as:

A CONFLICT (aroused) → HOSTILITY (unexpressed) → MIGRAINE

4. The role of the spouse as a contributing etiologic factor and experimental production of headache by psychologic means are areas of investigation which might prove fruitful.

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(Continued on page 108)

# A New Anesthetic for Certain Diseases of the Skin

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NEW local anesthetic, known as Tronothane A Hydrochloride, was synthesized by Wright and Moore. The chemical nature of Tronothane Hydrochloride (gamma-Morpholinopropyl 4-n-Butoxyphenyl Ether) is quite different from other local anesthetics now in use, and it may become a valuable agent for the treatment of individuals who are sensitive to topical agents. It is not a derivative of para-aminobenzoic acid. Richards and Schmidt<sup>2</sup> have studied the acute and chronic toxicity of Tronothane in several species of laboratory animals and found it to be very low. The L.D. dose for mice was approximately 450 mg. per kilogram of body weight intraperitoneally, 1900 mg. per kilogram subcutaneously, and 100 mg. per kilogram of Tronothane intravenously. Comparative L.D.<sub>50</sub>. doses of procaine are 220 mg. per kilogram of body weight intraperitoneally, 800 mg. per kilogram subcutaneously, and 55 mg. per kilogram intravenously. A total of 10 gm. per kilogram per mouse given in daily subcutaneous injections over a period of twenty-two days was tolerated by 13 of 15 mice. Rats, rabbits, and dogs showed a corresponding tolerance to subcutaneous injections. No alteration in the blood, kidney, or liver function tests were observed, and no gross or microscopic changes were seen in tissues on autopsy.

Schmidt and Berryman,<sup>3</sup> on human volunteers, showed that Tronothane has, under most rigid test conditions, a lower sensitivity and irritation potential than another widely used topical anesthetic.

A 1 per cent concentration of Tronothane was used in this investigation in jelly and ointment form. The jelly was used in the treatment of 186 patients while the ointment was used in 76 patients. The preparation was not used for the treatment of any patient who gave a history of sensitization to "grease" or "salves." No claims have been made that this preparation might

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produce a cure. It was studied to determine whether or not it would give relief in pruritic syndromes of local and widespread distribution.

This investigator has had considerable experience with preparations containing local anesthetics. Determinations were made in advance that the concentration of the anesthetic in Tronothane Hydrochloride Jelly was well below any possible degree of toxicity on local application. Tainter and Winter<sup>4</sup> have pointed out that benzocaine is an excellent topical anesthetic when used in concentration of at least 10 per cent strength. Clinically, however, no greater percentage of an anesthetic should be used than is necessary to secure reasonable results.

There were 83 cases of chronic dermatitis of widespread distribution, most of which involved the sides of the face, neck, and upper extremities. This condition is usually termed disseminated neurodermatitis. These lesions had persisted for various lengths of time and had previously been resistant to treatment. Tronothane Hydrochloride Jelly was used in an effort to give symptomatic relief while studies were being carried out to determine etiologic factors, if possible. In this group, 62 patients experienced an amelioration of the pruritus, while in 11, diminution of itching did not occur to any extent. Further studies showed that this group was composed of patients with contact etiology. Side contact etiology was present in 3 patients.

So-called atopic dermatitis was found in 34 patients. These cases were localized in distribution—confined to the usual areas such as antecubital and popliteal spaces, either together or separately. Pronounced symptomatic relief occurred in 26 patients, and 5 showed some improvement. The dermatitis was definitely aggravated in 3 patients, and the medication had to be discontinued. So-called atopic dermatitis is among the common skin diseases. The patients included in this series were adolescents and older individuals. On clinical examination, the dermatitis was found to be of the lichenoid type

Tronothane Hydrochloride furnished for clinical trial by Abbott Laboratories.

Diagnosis	Number of patients	Pronounced relief	Per cent	Moderate relief	Per cent	Number improved	Per cent	Remarks
Chronic dermatitis (upper extremities mostly)	83	62	75	10	12	11	13	
Contact dermatitis	34	26	76	5	15	3	9	
Senile dermatitis	28	20	71	7	25	1	4	
"Dry skin"	22	22	100	-	-	-	_	No permanent improvement
Pruritus of scalp	19	16	84	-	-	3	16	
Total	186	146	79	22	12	18	9	

and, as stated previously, seen most often on the flexor surfaces. Most of the lesions were large lichenified plagues which were usually localized on the above mentioned areas of symmetrical distribution. Some patients had lesions at the nape of the neck. These eruptions are usually intensely pruritic so that symptomatic relief is especially welcome. As is well known, the etiology is obscure in these cases; the detailed allergic studies had not been of much therapeutic help.

Of 28 elderly patients, 20 who had a widespread senile pruritus experienced a definite decrease of itching. Some relief was experienced by 7 patients, and, in 1, the preparation produced a definite irritation. Tronothane Hydrochloride Jelly produced relief in all of 22 patients with dry skin. Of these, 16 had some mild, diffuse scaling of the skin and 6 had dry skin of the hands. No permanent improvement of the original condition resulted. Of 19 patients, with localized severe pruritus of the scalp, 4 also had involvement of the genitalia. There were no objective cutaneous findings in any of these cases. Pronounced lasting relief was experienced by 16, but 3 patients felt there was no improvement. In cases of scalp pruritus, any real cause was extremely difficult to detect. This was probably due to a neurotic background. All systemic constitutional diseases, such as diabetes, had been ruled out.

As was stated previously, the preparation was

not used in any patient who gave a history of apparent sensitization to any ointment. It was not used in acute dermatoses, such as dermatitis venenata, and, so far, has not been used in cases of severe itching, such as dermatitis herpetiformis and lichen planus. The possibility that the jelly or the ointment base might, in itself, produce soothing results was investigated. In such cases where the "placebo" was used, some relief was secured, but not compared in relative degree to the preparations which contained its ingredients.

Cross-sensitization in individuals who had developed previous sensitivity to other topical anesthetics is apparently neglibile. Base penetration, using either the jelly or ointment form, clinically favored the jelly form.

#### CONCLUSION

Tronothane Jelly has been used in several types of dermatitis which are associated with pruritus. Many of these cases did not respond to medications used previously. This series included 186 patients. Of these, 83 had chronic dermatitis usually involving the upper extremities; 34 had contact dermatitis; 28 senile dermatitis; 22 "dry skin"; and 19 pruritus of the scalp. A high percentage of each group experienced pronounced relief of itching. Of the total series, 79 per cent reported definite improvement. Although pruritus associated with dry skin was relieved in 100 per cent of 22 patients, no permanent improvement occurred.

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## Realism and Mental Health\*

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Most interesting development has been go-Hing on in New York state and several other states during the last few years. This development is the steady growth of citizen interest in mental health. This interest has been expressed by individuals alone, and by groups such as county or state mental hygiene associations. Heightened interest in the field of mental health was hastened after World War II when many families had to care for the mentally handicapped veteran after discharge from the service. Psychiatric services, which had been available in the armed forces, were sought in community settings not only for the mentally handicapped veteran but for other adults and children who, perhaps for the first time, realized that mental hygiene offered hope for relief of mental suffering. Usually, before World War II, the psychiatrist was thought to be a person who treated only "insane" or, more properly, mentally ill people. Fortunately, since the war and with an increasing frequency, people are inclined to think of many psychiatrists as doctors who can help solve fairly average human emotional problems. The care and prevention of emotional disorders is, of course, the major concern of psychiatrists, but there is also a real concern on the part of many psychiatrists to promote positive mental health.

Public realization of this concern has led to a great demand for services. That help is wanted is evidenced by the fact that mental hygiene clinics everywhere have long waiting lists. Not only are many people referred by established agencies, but many patients today are self referred. This demand puts the final pressure on the clinic. It will be years before enough professional workers are trained in the field of mental health. By professional workers are meant social workers, psychiatrists, nurses, psychologists, and mental health educators.

This paper will be divided into two parts. The

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first part will attempt to point out "some facts we face today." The second part will outline some "concrete suggestions" as to how to proceed with a workable and safe mental health program. I can think of no more interesting and valuable challenge than the development of a mental hygiene program that will eventually influence the lives of every citizen, every adult, and child in this country.

Justified optimism is believing that in duc time goals for mental health only dreamed of "today" can certainly be reached "tomorrow." We must think in practical or "reality" terms and be careful not to oversell a program before the program can be thoroughly tested, successfully implemented, and presented for commu-

nity use.

An example of the danger which is involved could be cited. This example is taken from my own profession. If a physician, for some reason, has promised relief for symptoms and for some unpredictable reason is prevented from supplying that relief, what happens? That physician often receives open hostility or criticism. This criticism sometimes comes in the form of malicious gossip. The gossip is rationalized by the patient with this kind of thought, "My doctor has let me down." As a consequence, the physician receives the treatment in reverse that he has apparently dealt out to others.

In the field of mental health this possibility is a far more serious hazard than in the field of physical health. The reason for this is that in the field of mental health the symptoms experienced result from far more personal reasons, and are thought of not as referring to some organic biological system, but to one's very self, one's character, personality, or one's whole life. Hence, we must be doubly careful when relief for mental suffering is promised. We must be able to deliver whatever is promised without much delay.

In clarifying this we might recall that for certain entities such as cancer, heart disease, syphilis, and so forth, the primary effort is against disease or illness. In mental hygiene there is not

<sup>\*</sup>Read at the annual meeting of the New York State Society for Mental Health, May 1952.

only a fight against disease, but also a fight for mental health. In mental hygicne, efforts are made to secure mental health. Such a preventive program implicitly promises for each individual greater happiness, security, and relief from mental suffering. We must be careful to set reasonable boundaries when speaking of what can be accomplished and have some realistic goals when we start calling the attention of citizens to mental health activities. As we know only too well, a preventive mental health program must deal mostly with intangibles, such as emotions and feelings, interpersonal relationships, attitudes, and morale.

With this background in mind let us look at just a few facts to be faced in this field.

Ignorance is still our greatest enemy. The fund of knowledge from research, however, is larger even now than generally realized or utilized. Our primary problem is to find methods to disseminate this fund of knowledge to those who have not as yet become aware of mental health principles. Our search for technics to transmit this knowledge must be relentless. One of the finest media for this yet devised are the dramatic sketches of Nora Sterling. These plays are not only good entertainment, but they are fun to produce and they teach by example, not by threatening slogans nor frightening stories. Some movies are helpful too, when followed by discussion directed by a trained leader. Institutes for group learning are in their infancy but are showing great educational possibilities. We are still handicapped by not yet knowing tried and proved ways in which to banish the ignorance of mental health principles. This will be discussed later in this paper.

Where does this ignorance appear? Take the concept of love, for instance. We need to learn how to make others feel this love. Much of this knowing *doesn't* come naturally. We know that occasional loss of temper with children, or with the marriage partners, is to be expected and can be tolerated if, most of the time, true love can be communicated. Love, however, is not conveyed by telling others what to do. This is domination and not love. We know that to love is a basic principle of mental health. We must learn how to actually show love and how to do things to and for others. We need also to try to further differentiate discipline from punishment. Severe punishment usually breeds resentment and hostility rather than promoting enthusiastic and industrious living.

We sometimes forget that parents may be emotionally uneasy when children are born to them, and quite unaware of the reason. There is help for this, but nevertheless jealousies do arise in parents, fears of parental displacement may develop, and the child accordingly may suffer from some sense of "loss." A full understanding of these factors is vital for everyday good mental health.

Another area where ignorance lurks is in the use of authority. Some people in authority do not appear concerned about the mental health of young people. Some parents, teachers, professors, physicians, scout and camp directors, can see only the need for their temporary "subordinates" to obey orders. Such obedience gains the immediate objective, which is compliance leading to peace and quiet. The price for this kind of obedience is paid later in life. It leads either to counterattack or to undue submission.

Human beings find it difficult to accept and assimilate new facts and new attitudes. It can only be hoped that individuals will be interested in putting forth real effort to accomplish better skills in living, because eventually these skills will lead to less conflict in daily life. The educational process which helps people learn must be a process which draws people without frightening them.

Not only are we attempting to make some change in fundamental human attitudes, but we are making this effort at a time when our American culture itself is rapidly changing. The role of woman as a wife, mother, and wage earner has changed greatly in the last fifteen years. Many other equally dramatic changes have taken place. For these reasons we are faced with making a double shift in attitudes.

The last fact which I wish to emphasize concerns the need for reevaluating attitudes about the cure of emotional disorders. Cure of emotional disturbances must be thought of in terms of continuous positive adaptation. This is in contrast to conventional thinking about organic disease. One of the results of the germ theory of disease is that cure has usually been thought of in terms of the killing of the germ or the banishment of other noxious stimuli. There is a temptation to apply this kind of reasoning when speaking of the cure of mental disorder. This can rarely be done. Adaptation results when positive personality forces are strengthened by learning new skills in living, and by the rediscovery of old skills which might have been buried under loads of anxiety and depression. Resolution of negative forces such as feelings of fear and hostility and resentment, by understanding the causes of these feelings will further the adaptive process. This procedure enables the emotionally instable individual to turn his emotional disharmony into harmony so that life's many problems can be met more constructively. It is reasonable to expect, with proper mental hygiene help and information, that personality growth will lead to a state of adaptation where crises and problems can be handled constructively.

Let us now turn to some of the aspects of a practical program. This program should be one that can lead to immediate action. With this the major emphasis, much of the danger of promising more than can be delivered will be avoided. Several points can be appropriately emphasized.

An important part of a mental hygiene program is voluntary work by citizens in mental hospitals. Such voluntary work not only provides better services for the mentally sick, but it helps outsiders understand more about mental illness. Such activities can lead to improved citizen attitudes toward mental illness and give more insight on this topic than any number of lectures on the subject. Many misconceptions, as well as much ignorance and fear about mental illness, results from isolation of patients in hospitals. Whereas hospitalization is necessary for care and treatment, isolation and secretiveness should be avoided as much as possible. Trustworthy volunteer workers in mental hospitals can help to bridge this gap. Plans for the organization of such activities are available from the National Association for Mental Health.

The Temperate Zone plays written by Nora Sterling have already been mentioned. These dramatic sketches spell out causes and results of many highly charged emotional relationships in families, especially related to children. These plays, plus others of this type which are now available through the National Association for Mental Health, provide a medium where people can participate and produce something which is interesting and attractive, and which at the same time tells a story of mental health dynamics which is clear and appealing. These plays can be produced by lay groups. A discussion guide is also available.

Building a library of mental health films is now a possibility. There are many good films available but for only a few are there companion discussion guides. Because most mental health films contain so much psychologic material, and because this material often produces some undue anxiety in the audience, a trained discussion leader should be present to answer questions as well as to guide the discussion. Both films and plays never fail to spark a group

discussion, and they have been proved to be of value in mental health education. A library of good films can be built up at moderate cost.

Because trained personnel will not be sufficient to meet the demand for some years, possibly some community leaders who are particularly gifted with "emotional understanding" and who are interested in mental hygiene methods, can gather in small institutes and in a few days be given such technics as are necessary to start a local mental health program. This part of the program is needed if progress is to be made in those parts of the country that do not have the type of leadership available in urban centers.

Similar institutes for grade school and high school personnel could be organized which would help teachers and principals to understand mental health procedures. Such help is being requested in many localities, and when requests can be met the response is excellent.

Small local homogeneous groups can be a particular advantage in a community. Such groups could be organized and members could study such fields as adolescence, middle age, old age, infancy, marriage adjustment, and so forth. Through these studies some self understanding is gained as well as much reassurance. In Baltimore, Maryland, groups have started with some specific topic and before long branched out in other directions which are equally important. Although this educational method is relatively new and untried, it may prove to be one of the most effective.

Physicians who have practiced in local communities know that families of mentally hospitalized patients can usually give each other more reassurance than any other person. This kind of organization has not been attempted often but could be carried out in almost any community.

As treatment services are demanded by communities, a small nucleus of interested people could be organized to investigate the groundwork which must be done before a community clinic can be organized. The groundwork needed for a clinic in most localities requires at least two years of toil. Citizen interest, support, and trust are needed if the clinic's development is to be effective.

The last practical point for emphasis is that eventually mental hygiene societies must take the leadership in promoting legislation at the state and local level to promote the welfare of those who are mentally sick. We cannot leave planning of this kind up to official government agencies. Citizen groups are usually not politically handicapped, and, therefore, once the need



This department of The Journal-Lancet is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.

# Intravenous Iron for Extreme Anemia in a Patient Who Refused Blood Transfusion

REUBEN BERMAN, M.D. Minneapolis, Minnesota

This report is a case study of an individual suffering from a duodenal ulcer with many complications including simultaneous hemorrhage and obstruction. The patient's objection on religious grounds to transfusion thwarted any successful therapeutic approach to his disease. Urgently indicated surgery was prohibited by extremely low hemoglobin levels. Oral iron was contraindicated by the obstruction. The medical dilemma was resolved by a spectacular response to intravenous iron.

The parenteral use of iron in doses ideal for hemoglobin regeneration prior to 1947 was limited by toxic and painful reactions.<sup>1</sup> In that year Nissim reported the successful treatment of iron deficiency anemia with intravenous saccharated iron.<sup>2</sup> Since then many reports on its use have appeared in the literature.<sup>3–9</sup>

In iron deficiency anemia first consideration should be given to oral iron therapy. Oral iron may be interdicted by such gastrointestinal diseases as gastritis, obstruction, or chronic ulcerative colitis. The more rapid action of intravenous iron may be required in anemias of late pregnancy,<sup>8</sup> in nutritional anemias,<sup>10</sup> and in parasitic infestation.<sup>11</sup> An additional indication for intravenous iron is presented in this case report. The indicated blood transfusions were refused by the patient on religious grounds.

#### CASE REPORT

The patient is a 68-year-old white rancher, a member of the religious sect of Jehovah's Witnesses, who was admitted to Mount Sinai Hospital in Minneapolis on March 13, 1952. His presenting com-

REUBEN BERMAN, a 1933 graduate of the University of Minnesota, is clinical assistant professor of medicine at the University and is on the staff of Mount Sinai, Asbury, St. Barnabas, and Veterans' hospitals.

plaints, all appearing since December 1951, were recurring abdominal pain, weakness, nausea and vomiting, recurring gastrointestinal hemorrhages, and extreme weight loss. The illness began in December 1951 when he began to have severe abdominal pain after meals which prevented him from sleeping at night. Shortly after the onset of this pain he began to have nausea and considerable vomiting. He was admitted to a hospital in January 1952 when he had his first gastrointestinal hemorrhage. He vomited dark blood and had black stools. From that time on he found that he was unable to eat solid foods because of vomiting and abdominal pain. For the next three months the only nourishment he received was skim milk and grape juice. These liquids were tolerated with little vomiting. He was discharged from the hospital after a few days and was readmitted in February 1952 with a second hemorrhage. A third hemorrhage with vomiting of blood and black stools occurred the first week in March. The patient estimated his weight loss to be 60 lb., from a weight of 150 lb. in December 1951 to the estimated March 13 weight of 90 lb. From January 1, 1952, the patient was constantly bedridden. Finally he was unable to raise his head off the pillow.

The only past history of importance concerns the gastrointestinal system. He had been taking soda for relief of occasional abdominal pain for at least twenty years. The first diagnosis of duodenal ulcer was made in 1946. At that time he had some upper abdominal pain and a roentgenogram was reported to show a deformed duodenum. In 1948 he had severe upper abdominal pain with a ruptured duodenal ulcer. He was operated upon and the perforation repaired. He was referred to Mount Sinai Hospital by Dr. C. Lund of Williston, North Dakota.

The patient was conscious, cooperative, but responded very little and spoke only in monosyllables.

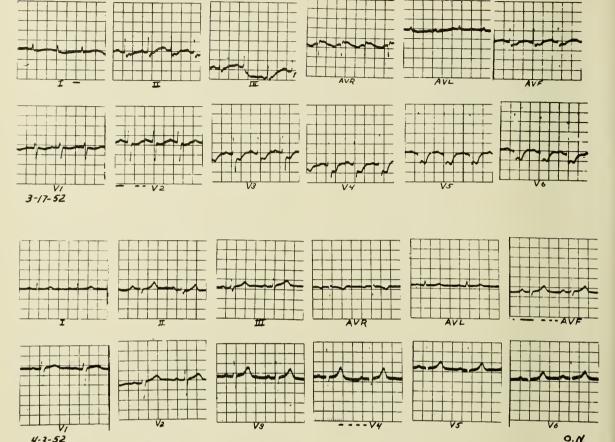


Fig. 1. Electrocardiogram March 17, 1952. Hemoglobin was 3.3 gm. Chest leads V<sub>3</sub> to V<sub>6</sub> show extreme S-T and T wave changes characteristic of anoxia of the myocardium. On the electrocardiogram of April 3, 1952, these changes had reverted to normal. Hemoglobin was 9.0 gm.

Extreme pallor of the skin and mucous membranes was present. The general appearance of the individual was that of a moribund patient with extreme cachexia and remarkable pallor. His weight was estimated to be 90 lb. Admission blood pressure was 90/40. The heart tones were faint; no murmurs were heard. The lung fields were clear. The abdomen was extremely scaphoid. There was a right upper quadrant scar from the old operation. No masses were felt and no tenderness was present. Rectal examination revealed only a fecal impaction. Extremities were extremely emaciated. Several decubitus ulcers were found, 1 over each greater trochanter and 1 over the sacrum. These were small and superficial.

Admission laboratory studies showed: hemoglobin, 3.7 gm. per cent; red blood count,  $2.29 \times 10^6$  per cmm.; white blood count, 13,600 per cmm.; differential, 79 per cent polymorphonuclear cells, 20 per cent lymphocytes, and 1 per cent monocytes. There was 6.7 per cent reticulocytes. The blood morphology showed hypochromasia, moderate anisocytosis and poikilocytosis with some polychromasia. The urine examination was negative. The blood urea nitrogen was 10 mg. per cent;  $CO_2$ , 64 volumes per cent (29 mEq. per 100 cc.); chlorides, 690 mg. per

cent; serum proteins, 5.5 gm. total; albumin 3 gm., and globulin 2.5 gm.

The electrocardiogram (figure 1) showed depression of  $ST_2$  and  $_3$ , depression of ST in  $V_3$  to  $V_6$  interpreted to be due to severe subendocardial ischemia. Chest roentgenogram was negative. Bone marrow aspiration showed myeloid hyperplasia.

Admission diagnoses included active duodenal ulcer with obstruction and hemorrhage, severe iron deficiency anemia, and extreme inanition. The patient vomited only once after his hospital admission. Nocturnal gastric aspiration was started the second day. The first specimen contained 800 cc. of milky fluid. With succeeding aspirations the amount diminished to 300 to 400 cc. daily. He was able to imbibe between 1,000 and 1,500 cc. of skim milk daily. He was given 2,000 to 3,000 cc. of intravenous fluids daily. Amigen was given for the first five days, after which time Aminosol with 7 per cent alcohol added was administered. His average daily caloric intake was 2,500 including 500 calories from 1,500 cc. of skim milk and 2,000 calories from 2,500 cc. of Aminosol with dextrose and alcohol.

The patient's refusal to accept blood transfusion was adamant. Therefore, he was given intravenous (Continued on page 106)



"A powerful vasodilator effect."
White, S. M.: 33:133, 1950

"Toxic effects . . . minimal."
Murphy, J. R.: 51:2407, 1951

"Safely given over prolonged periods."

Redisch, W., and Brandman, O.: 1:312, 1950

"Remarkable results in vasospastic disorders...Buerger's disease...chronic trench foot."

Redisch, W.: 46:368, 1949

"More effective . . . in arteriosclerosis obliterans. Angina of effort markedly diminished."

Richter, I. H., Fogel, M.; and Fabricant, H.: 51:1303, 1951

"No effect upon systemic blood pressure or cardiac rate."

Crosby, R. M. N.: 225:61, 1953

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iron starting with 20 mg. (1 cc. of Proferrin) on March 14. He was given 40 mg. on March 15 and then 100 mg. daily intravenously for fourteen days. He received a total of 1.460 gm. elemental iron. Additional therapy included magnesium trisilicate and aluminum hydroxide mixture (Gelusil) and various parenteral vitamin preparations. On this regimen rapid improvement occurred. His weight was 115 lb. four weeks after his admission, an estimated gain of 25 lb. The hemoglobin rise is indicated in figure 2. The increase of hemoglobin from 3.3 gm. on March 17 to 10 gm. on April 11 represents a rise of .27 gm. of hemoglobin per day. The maximum reticulocyte response, 30.4 per cent, occurred on the eleventh day of therapy. The electrocardiographic changes disappeared (figure 1). After three weeks of therapy the patient was up and about.

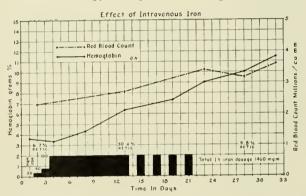


Fig. 2. Graph of response to intravenous iron therapy during thirty-three day preoperative period.

Partial gastrectomy was performed by Drs. Arnold Kremen and David Gaviser on April 22, 1952. A chronic constricting duodenal ulcer was found just beyond the pylorus. The postoperative course was uneventful. The patient was discharged May 1, 1952, weighing 111 lb., and eating an unrestricted diet. Dr. Lund reported January 25, 1954, that the hemoglobin was 88 per cent, the weight, 171 lb. The patient was then working again as a rancher.

#### DISCUSSION

The needs of this patient would have been better served by early transfusions of whole blood or red

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cells. Electrocardiographic findings of severe subendocardial ischemia suggest that persistence of the anemia might have led to myocardial infarction. His refusal to accept blood transfusions precluded surgery recommended to him in January and February. The circumstances forced us to rely upon intravenous iron in extreme anemia. We were thus able to study the effect of intravenous iron at a low level of hemoglobin not usually permitted in clinical practice. The religious basis of the objection of Jehovah's Witnesses to transfusions lies in a number of Biblical passages, especially in Leviticus:

"Whatsoever man there be of the house of Israel or of the strangers that sojourn among them, that eateth any manner of blood, I will set my face against that soul that eateth blood, and will cut him off from among his people. . . . The life of the flesh is in the blood. . . . No soul of you shall eat blood, neither shall any stranger that sojourneth among you eat blood."12

The rate of hemoglobin increase, 0.27 gm. per day, is greater than the average increase of 0.16 gm. per day in adults reported by Lucas.9 Stransky et al. report increases of hemoglobin in Filipino children with parasitic intestinal disease of 0.3 gm. daily.<sup>11</sup> They abstained from blood transfusions at hemoglobin levels as low as 1.5 gm. per 100 cc. of blood.

The chief danger of intravenous iron is inherent in the lack of a mechanism for iron excretion.4 The total dose administered must be calculated to replace only the deficiency encountered. Murphy<sup>13</sup> estimates that 100 mg. of intravenous iron will increase the hemoglobin in an adult by 4 per cent. Thus, an iron deficiency anemia of 9 gm. per 100 cc. representing a 40 per cent anemia will require a total dose of 10 x 100 or 1000 mg. of elemental iron.

At intravenous dosage levels of 100 to 200 mg. toxic reactions are infrequent.4 These reactions included local inflammation from extravenous infiltration, flushing of the face, nausea, vomiting, headache, abdominal pain, and chills and fever.8.9 Report of 1 fatal reaction after use of intravenous iron has been recorded.<sup>14</sup> The patient was a 69-year-old male who died thirty minutes after injection of 100 mg. of saccharated iron. Autopsy showed an occluded right coronary artery but whether it was a recent or old occlusion is not mentioned.

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#### PSYCHODYNAMIC ASPECTS OF MIGRAINE

(Continued from page 97)

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#### REALISM AND MENTAL HEALTH

(Continued from page 102)

becomes apparent for legislative action, they can proceed to make proper recommendations.

The goal is to banish ignorance and falsehood. The goal can be reached only step by step through education and leadership in practical programs. Promising too much will lead to eventual disappointment and to hostility. A sales program in which people are frightened into action is especially bad. A solid program can be sold based on hard work and citizen participation.

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N.B.: In whooping cough patients, Robitussin proved universally palatable and reduced coughing by 50 percent.

—From "The Successful Treatment of Cough", by K. Blanchard and R. A. Ford, reod of North Pocific Pediotrics Society Conference, September 1953. The Effect of ACTH and Cortisone Upon Infection and Resistance, edited by Gregory Shwartzman, 1953. New York: Columbia University Press. \$5.50.

Since the actions of pituitary and adrenal hormones in the body are extremely complex, and at the same time are of determining importance to infection and resistance, this volume is both timely and valuable. It comprises the contributions of the participants in a symposium sponsored by the New York Academy of Medicine. Many aspects of the subject are discussed, from the effects of cortisone upon enzymatic reactions to the effects of ACTH and adrenal cortical hormones upon neoplastic growth, allergic diseases, tuberculosis, syphilis, trypanosomiasis, pneumonia, and virus diseases. The participants in the symposium are all productive investigators and their reports and discussions are rich in factual material and critical in approach. The dramatic effects of cortisone in altering the host response to infectious agents and to toxic substances have provided a powerful tool for the study of the mechanism of host responses. A new era in pathologic physiology has been ushered in with the discovery of these

The effects of adrenal hormones upon such processes as lymphocytoclysis, hyaluronidase activity, antibody formation, anaphylaxis, capillary permeation, the Shwartzman reaction, and many others are described and discussed. The book is intended as a summary of current knowledge. It will be extremely valuable, not only to research workers but also to physicians who desire to learn what is known today about the role played by pituitary and adrenal hormones in responses to infection.

MAURICE B. VISSCHER, M.D.

Introduction to Physiological and Pathological Chemistry, by L. EARLE ARNOW, 1953. St. Louis: C. V. Mosby Co., 508 pages. \$3.75. This book is the fourth edition of a widely used textbook for students of nursing. It is intended for a survey course of one quarter or semester in which the whole field of chemistry, organic chemistry, organic chemistry, and physiological chemistry.

The author was assisted by Marie C. D'Andrea, educational director of the School of Nursing, St. Vincent's



Hospital, Indianapolis. As a result, a number of changes have been made at her suggestion. For example, a chapter has been added on "Nuclear Reactions and Atomic Energy" which serves as a background for training in disaster nursing. The material on the chemistry of blood has been put into a separate chapter instead of being discussed under other topics as in previous editions. The laboratory experiments, which were formerly included with the text, are now published separately.

In addition to the above changes,

In addition to the above changes, a number of items of historic and practical interest have been added in small type throughout the book. These major additions and changes together with many minor changes combine to increase the quality of a book that was already first class in its field.

CHARLES W. CARR

Principles of Refraction, by S. J. Beach, 1952. St. Louis: C. V. Mosby Co. \$4.00.

This volume presents much valuable information for anyone interested in ophthalmology or who expects to use such information in his professional work.

Dr. Beach gives proper consideration to the general health of the patient and the possible effect his health might have on satisfactory refractive services, Refraction is given its proper place of importance in surgical procedures.

His many examples explaining various types of lenses do much to fix in mind mathematical equations and their attendant results in problems of optics.

From the first chapter on "Practical Optics" to the final chapter on "Ocular Neuroses," the pages of this book are filled with checks and double checks, which serve to keep the reader on the right path toward

his goal of accurate refraction.

Ability to ascertain facts by use of the ophthalmoscope and retinoscope is given deserved prominence. Many valuable ideas are presented for use in refracting whether with or without cycloplegics. It is evident that Dr. Beach has little regard for "casual methods" in this important work.

Perhaps few ophthalmologists are also reliable psychiatrists and while one may easily enter deep water in consideration and treatment of ocular neuroses, the oculist can actually prove the presence of a condition. Therefore, he may be a little better off than the general practitioner who may be forced to rely a bit more on hope.

Dr. Beach has rendered a distinct service in presenting this book.

Francis M. Walsh, M.D.

The Normal Cerebral Angiogram, by ARTHUR ECKER, M.D., 1951. Springfield, Illinois: Charles C Thomas, 182 pages, 147 illustrations. \$7.25.

This book is divided into two parts. Part one describes the technic of performing cerebral angiograms. The smallest details are described. The importance of team work and the duties of each member of the team are explained. The author explains the protection devices which he uses against irradiation. Diagrams are given of methods for obtaining filling of the internal carotid arteries as well as the vertebral arteries. Complications which may actually or theoretically arise are brought out in the discussion. Arterial spasm, pain, local tenderness, vomiting, convulsions, and other minor symptoms are discussed. Factors which would minimize these occurrences are mentioned. Severe complications such as hemiplegia, respiratory embarrassment, and death are known to have occurred and these are given consideration by the author.

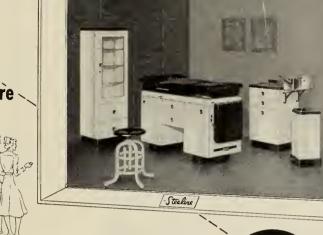
The second part deals with the actual description of the normal arterial and venous pattern as seen on the x-ray films. Artefacts are also discussed. Many illustrations are used, most of which are actual reproductions of x-ray films. One of the disconcerting features is that the reproductions are positive prints. They are, however, of good quality and very clear. The use of abbreviations is a good idea, but I think the publisher might also have provided a card with the key to the abbreviated letters to use as a book mark. The book should not only be read once but kept as a reference as all of the material presented cannot be absorbed in one reading.

LEO BLANK, M.D.



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## News Briefs . . .

#### North Dakota

Dr. D. W. Palmer's two-doctor clinic building opened in Cando on February 8. The ceilings are covered with sound-deadening acoustical tile and modern fluorescent lighting is found in every room. The clinic stands as proof of the progressive attitude of the people of the community.

ELLENDALE has now established a clinic. The move was made possible when Dr. Gestur Kristjansson arrived in town to become an associate of Dr. Ellis Oster. The community now has twenty-four hour medical service, and both doctors are able to devote more time to post-graduate study.

Though the state hospital for the mentally ill at Jamestown is inadequate in many ways, Dr. Russell O. Saxvik, superintendent of the hospital, is optimistic about its future. Improvements are gradually being made. New equipment is being installed and quarters refurnished. Dr. Saxvik believes the institution will become one of the best of its kind in the midwest. He bases his optimism upon the belief that the people of the state have the will to improve it.

Dr. A. D. McCannel was honored recently at a dinner in Minot. Tribute was paid to Dr. McCannel for his fifty-three years of service as both physician and civic leader. A native of Ontario, Dr. McCannel studied medicine at the University of Toronto in London. In 1907 he established permanent residence in Minot and through the years gained wide recognition as physician and community leader.

DR. WILLIAM KITTO and DR. R. E. DORMONT, both pediatricians, recently joined the Northwest Clinic in Minot. Dr. Kitto practiced at Ft. Collins, Colorado, before going to Minot. Dr. Dormont came to Minot from the Kimbro Clinic, Cleburne, Texas.

DR. WILLIAM J. PERRY recently joined the Fargo Veterans Administration Center as surgeon to the medical staff. A graduate of Northwestern University, Dr. Perry came to Fargo from Veterans Administration Hospital at Vancouver.

#### Minnesota

The New Elias P. Lyon laboratories building at the University of Minnesota was dedicated February 11. Named in honor of the late Elias Potter Lyon, dean of the medical school from 1913 to 1936, the new structure houses laboratories for histochemistry, cancer biology, and biophysics.

Construction of a new animal research laboratory is considered a major step forward for Mount Sinai Hospital, Minneapolis, in its program of medical research and teaching through affiliation with the University of Minnesota. The new laboratory will provide space not only for animal research but for other types of medical research and experiments with radioactive isotopes.

Dr. David Glick, professor of physiololgical chemistry at the University of Minnesota, will deliver two lectures in March at the Royal Caroline Medico-Surgical Institute of Sweden in Stockholm. Dr. Glick has also been asked to speak in the Carlsberg Laboratory in Copenhagen.

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DR. Andrew T. Rasmussen, professor emeritus of anatomy at the University of Minnesota, joined the faculty of the University of Southern California in February. An authority on the human central nervous system, Dr. Rasmussen retired in 1952 from the University of Minnesota where he had taught for thirty-six years.

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DR. LAWRENCE C. KOLB, Mayo Clinic, Rochester, has been appointed director of the New York State Psychiatric Institute and professor of psychiatry and executive officer of the department of psychiatry at Columbia University. He also will be director of psychiatric service at the Presbyterian Hospital. All appointments become effective July 1.

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DR. DONN G. Mosser, instructor in radiology at the University of Minnesota, was awarded one of three American Cancer Society fellowships in clinical radiation therapy for study in Great Britain, France, and the Scandinavian countries. Dr. Rasmussen will leave for Europe next August and be gone for more than a year.

#### South Dakota

SOUTH DAKOTA newspapers and radio stations are to receive annual awards for stories and editorials on health. In addition, a certificate and a \$50 savings bond will be given the individual preparing, editing, reporting, or planning the article or broadcast. The plan was formed as a result of a meeting of the council of the state medical association.

St. Joseph Hospital of Mitchell recently received an incubator from an anonymous donor. The incubator was given so that premature, small, and ill babies will have a better chance to maintain that balance which insures life.

ic,

DR. FRANK A. RUDOLPH has reopened his office in the Mid West Clinic at Rapid City after a three-year absence. During his absence, Dr. Rudolph was located as a fellow in research surgery at Ohio State University and as resident in surgery at White Cross Hospital, Columbus, Ohio.

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The University of South Dakota has appointed Dr. Robert Delaney of Mitchell and Drs. Yale Charbonneau and Arthur B. Fossum of Huron as research associates for the University. The three physicians will leave on a thirty-day safari into the wilderness of Kenya, Tanganyika, and Uganda. They will combine official research with a big game hunting expedition.

Dr. Roman Bilak, after completing his internship at Sioux Valley Hospital at Sioux Falls, will open a clinic in Highmore. Dr. Bilak was born in the western part of Ukraine and he and his family experienced a life of terror under Communistic rule. Escaping first to Czechoslovakia and then to Germany, his family moved to the United States in 1949. Dr. Bilak continued his



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studies in Europe and after a year's internship at the University Hospital in Louvain was graduated with highest honors July 1953.

Dr. Maxwell Day has been appointed to the staff at the Rapid City Medical Center to be associated with Dr. Ray E. Lemley. Dr. Day, a graduate of St. Louis University School of Medicine, has had extensive training and experience in urology in private practice, military service, and postgraduate study.

Dr. Carl J. Bridge has opened an office in Wakonda. A graduate of the University of Wisconsin in 1950, Dr. Bridge interned at Burbank Hospital, Fitchburg, Massachusetts.

Dr. RAINIS BERZINS has opened a practice in Bowdle and is associated with Dr. Karlis Zvejnieks of Hosmer, Dr. Berzin's presence in the community fills a long felt need.

Dr. Gordon Anderson, who recently practiced medicine in Brandon, Manitoba, has joined Dr. Robert Goodman in practice at Powers Lake.

#### CORRECTION

In the article "Differential Diagnosis of Ocular Pain" by Hugo L. Bair, M.D., which appeared in January, the word "convex" in the second line of the second paragraph from the bottom of the right hand column on page 20 should read "concave."

## Deaths . . .

Dr. Andrew M. Thompson, well-known physician of Wahpeton, North Dakota, died January 24. Dr. Thompson had practiced in Wahpeton since 1930.

DR. ARTHUR T. HORSMAN, 90, who had practiced in Devils Lake, North Dakota, for fifty years, died January 28, at Cambria, Wisconsin. He was a graduate of the University of Cincinnati Medical School.

Dr. O. L. Peterson, 81, a physician at Cokato, Minnesota, for forty-five years, died January 30.

Dr. Finn Koren, 80, a physician at Watertown, South Dakota, for more than twenty-five years, died January 31 at his home in Chilliwack, British Columbia. Since his retirement, Dr. Koren has lived in Canada.

Dr. C. Earl Waldorf, 62, Redfield, South Dakota physician and coroner of Spink County for many years, died suddenly of a heart attack February 10.

Dr. Philip Donohue, 60, prominent St. Paul physician, died at Miller Hospital December 17.

Dr. Arthur J. Smith, 46, well-known Yankton, South Dakota physician, died of a heart ailment December 10.

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## A.C.H.A. News

A conference on Meatal Health was held at the Hotel Mayflower in Washington, D.C., October 24 and 25, 1953, sponsored jointly by the American Medical Association and the American Psychiatric Association. This conference was devised as a means of bringing to the attention of a large number of interested national organizations the nature and urgency of the many problems in the field of mental health. In addition to representatives of the two organizations, more than 50 national groups, ranging all the way from the American Academy of Child Psychiatry through the American Prison Association to the World Medical Association, were invited to send delegates to the conference for two days of intensive discussion. Dr. Dana L. Farnsworth attended as the representative of the American College Health Association.

Prior to the meeting, each representative of a national or international organization was invited to prepare a statement which would illustrate the activities of his group in the broad general field of mental health. All these statements were carefully studied, correlated, and summarizd in order to determine the chief foci of interest at present. The most interesting finding to emerge from this summary were answers to the question, "In your opinion what are the areas in the field of mental health which now receive too little consideration from any organization?" The three areas of endeavor considered to be of greatest importance from this point of view with ten organizations voting for each of them were: (1) Education of public for improved mental health and prevention of mental illness. (2) Teaching mental health in public schools, colleges, and universities. (3) Interdisciplinary cooperation in mental health programs. In descending order other problems included: research, problems of psychiatric consultation and treatment in small communities, training of specialists in the field of mental health, the improved care in mental hospitals, and psychiatry in industry.

The conference itself was divided into four general discussion sessions, centering around the subjects: (1) The Educational Process in Training Mental Health Workers, (2) Research, (3) Treatment, and (4) Prevention. Discussion leaders included: Dr. Paul A. Witty of Northwestern University, Evanston; Dr. Leonard Carmichael, secretary of the Smithsonian Institute of Washington; Dr. Gregory Zilboorg of New York; and Dr.

Eric Lindemann of Boston.

The sessions on Research, Treatment, and Prevention went along very much as would be expected, and everyone agreed that these three components are good things to have. The session on the Educational Process in Training Mental Health Workers experienced the most frustration. Two general schools of thought seemed to be uppermost in the minds of those attending the conference. Those persons primarily interested in education felt somewhat overwhelmed by the magnitude of the problems they faced, particularly in view of the low salpries paid to teachers and the difficulty in acquiring them, let alone securing enough of the right type of teachers. Those more closely allied to the psychiatric profession, however, were somewhat impatient with this point of view and felt that the whole group tended to avoid getting down to the educational process at all. Although this was probably true, the point was emphasized that members of the psychiatric profession and

educators have not yet learned how to communicate with one another in such a way as to be of the greatest pos-

sible mutual advantage.

One of the high spots of the meeting was the major contribution made by Mr. Justin Miller, representative of the American Bar Association. Mr. Miller displayed an extraordinary knowledge of mental health problems, particularly in view of his immense prestige and experience in the field of law. His comments and attitudes made many at the conference feel that ultimately a greater degree of common thinking between the two disciplines of law and psychiatry will be possible.

The conference emphasized the fact that mental health is the number one public health problem in this country and is the concern of every citizen. The fact that the American Medical Association could combine in this big venture with the American Psychiatric Association and, in addition, cooperate with 50 other organizations, was

a sign of real progress.

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Approximately 40 national organizations interested in aspects of health and education are joining with the American College Health Association in sponsoring the Fourth National Conference on Health in Colleges to be held May 5 to 8 at the Hotel Statler, New York City. Dr. J. L. Morrill, president of the University of Minnesota, is president of the conference. Previous conferences were held in 1931, 1936, and 1947.

The objectives of the conference will be to consider ways to protect and improve the health of college students through comprehensive and integrated programs of health service and health education and to formulate suggestions for relating college health programs to all other college functions. The theme will be: "Teamwork in Meeting the Health Needs of College Students."

Attendance of from 400 to 500 college and university presidents, deans, physicians, nurses, psychologists, specialists in physical education, health educators, student counselors, and others who have a stake in the health of students, including students themselves, is expected, according to Dr. Dana L. Farnsworth, medical director of Massachusetts Institute of Technology, who is chairman of the Conference Executive Committee.

Representatives of many of the sponsoring agencies met recently with the Executive Committee to help plan working seminars in which a cross section of the interested disciplines will be able to pool their problems and experience. A questionnaire sent to 200 college presidents throughout the United States by Dr. Morrill will

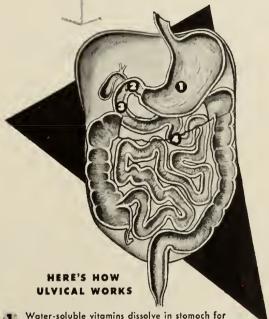
be one basis for conference planning.

Members of the Executive Committee, in addition to Dr. Morrill and Dr. Farnsworth, are: Carl R. Wise, M.D., university physician, Columbia University; George F. Anderson, Ed.D., assistant executive secretary, American Association for Health, Physical Education and Recreation; P. Roy Brammel, Ph.D., dean, school of education, University of Connecticut; Muriel Farr, R.N., Bryn Mawr College Infirmary; Dorothy Ferebee, M.D., director, student health service, Howard University; H. F. Kilander, associate professor of education, New York University; S. S. Lifson, director, health education division, National Tuberculosis Association; Norman S. Moore, M.D., director, student health service, Cornell University; Charles C. Wilson, M.D., professor of education and public health, Yale University; and Charlotte Leach, consultant, health education division, National Tuberculosis Association, secretary of the Executive Committee.

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#### FOREWORD . . .

To my old list of crocuses, robins, and Bock beer, I have had to add in recent years Dr. Jay Arthur Myers' request for an introduction to the April JOURNAL-LANCET as a sure sign of the approach of spring. This is always a pleasure and not a task.

Things are happening at an accelerated pace in the tuberculosis field. This is due in part to the cumulative effect of the progressively improved standards of living and to specific control measures employed relentlessly in past years, and

in part to the effect of the newer chemotherapeutic agents.

The midwestern states are in the vanguard in the conquest of tuberculosis. The rest of the country is looking toward that area as a preview of what may be expected in their own areas and for suggestions as to desirable policies for future control programs. Articles in the current issue of the JOURNAL-LANCET, together with articles in comparable issues in the immediate past years, are helpful in this respect.

Case finding is as important, if not more important, than ever with new and more effective drugs now available. Everything must be done to avoid premature

curtailing of this extremely important activity in the control program.

With a reduction in the average duration of hospitalization of the tuberculosis patient, an additional load is placed upon the public health nurse and other personnel involved in supervision of the patient and his family outside the hospital, and plans must be made to cope with this accentuated problem.

Tuberculin testing is going to become an increasingly important part of the tuberculosis control program, not only as an epidemiologic index of the location of areas needing particular attention by public health authorities, but as a means

of case finding.

Research for even better drugs and more effective combinations of drugs already known, together with a search for a vaccine without the limitations of

BCG, is still urgently needed.

This year, the tuberculosis issue is published in cooperation with the fiftieth anniversary celebration of the association. At the anniversary meeting, to be held in Atlantic City May 17 to 21, tribute will be paid to past accomplishments, but the general theme will be "The Challenge of the Future." The JOURNAL-LANCET joins with the National Tuberculosis Association in this spirit of perseverance toward the ultimate conquest of tuberculosis.

JAMES E. PERKINS, M.D.,

Managing Director, National Tuberculosis Association

## The Tuberculosis Problem in Colleges

H. D. LEES, M.D. Philadelphia, Pennsylvania

During the past five years the tuberculosis death rate has declined at a more rapid rate than at any time since the turn of the century. Provisional figures recently released by the Division of Chronic Disease and Tuberculosis, United States Public Health Service, show the 1952 tuberculosis death rate to be 15.5 per 100,000 population. This is a reduction of 22.9 per cent from the rate which prevailed in 1951. During the five-year period 1947 to 1952, the death rate declined 53.7 per cent. This figure represents a reduction in mortality equal to that attained in the previous seventeen years, 1930 to 1947. In planning for more effective control of tuberculosis in our colleges and universities, we must be guided by currently existing conditions. In some sections of the country the prevalence of tuberculous infection in young adults is considerably higher than in other areas. Mortality and morbidity rates in those areas from which we draw our students may be expected to have quite a direct bearing on tuberculosis morbidity in our student groups. In spite of the pronounced improvement in mortality, the control of tuberculosis in colleges still warrants a prominent place in the health program for students. Although mortality from the disease has declined more rapidly in the college age group than in older persons, experience at numerous institutions indicates very clearly that tuberculosis still ranks high as a health problem of the young adult.

It is encouraging to note that substantial reductions in tuberculosis deaths and death rates have occurred in practically all sections of the country, large urban centers as well as rural areas. The New York Tuberculosis and Health Association recently reported that the New York City tuberculosis death rate dropped from 27.1 in 1951 to 20.3 in 1952, a decrease of 25 per cent. New York state, exclusive of New York City, had a provisional death rate of 11.4 in 1952 as against a rate of 16.1 in 1951. This is a decrease of 29 per cent and is the greatest ever recorded in a single year. Whether the sharp

H. D. LEES, a 1910 graduate of the University of Toronto Faculty of Medicine, is director of the Student Health Service, University of Pennsylvania, Philadelphia. downward trend of tuberculosis mortality will be maintained during the next several years is, of course, a matter of conjecture. However, reports from various sources indicate that significant reductions in the death rate have continued into 1953. In the state of Pennsylvania, tuberculosis deaths for the first seven months of 1953 showed a decrease of 23.5 per cent from the number recorded during the corresponding period in 1952. Among industrial policyholders of the Metropolitan Life Insurance Company, the death rate for the first 10 months of 1953 was more than 25 per cent below the 1952 rate.

Although statistics relating to tuberculosis mortality are now quite accurate and reliable, reports of new cases of the disease have been far from complete. The true picture of tuberculosis morbidity is therefore rather obscure. The statement is frequently made that in spite of the sharp decline in tuberculosis mortality, no reduction has occurred in the number of new cases of the disease reported in recent years. In this connection, the fact must be remembered that case-finding activities have been greatly extended and intensified during the past six or seven postwar years. Since millions of persons are now reached each year by means of mass x-ray film surveys, the number of newly-found cases has materially increased. Moreover, since many of these case-finding programs are conducted in cooperation with local health departments, more adequate measures for follow-ups have been provided. Under these circumstances the family physician has been brought more actively into the picture, which has resulted in securing more accurate reports of new cases of the disease. Katz<sup>1</sup> maintains that the number of reported cases in a community does not provide an accurate estimate of tuberculosis morbidity. He contends that a more valid picture will be obtained by a consideration of the percentage yield of cases of tuberculosis among large and similar groups examined from year to year. In New York state, exclusive of New York City, tuberculosis hospital clinics provided 174,087 examinations, including chest x-ray films, during the three-year period 1939 through 1941. These examinations resulted in a yield of 2.8 per cent of cases of tuberculosis. In the period 1948 and

1950, nine years later, 245,279 examinations gave a yield of 1.7 per cent. This is a reduction of 40 per cent. Similar results were obtained among persons examined roentgenographically in community surveys and upon admission to general hospitals. In 1950 and 1951, the percentage yield of cases of tuberculosis among these groups was 22.9 per cent below that obtained only two years previously. These results are based on a total of 1,311,070 persons having roentgen examinations. Katz makes the following pertinent comment regarding his findings: "The lower percentage yield of new cases of tuberculosis in these large segments of the upstate population can be due to only one major factor, a decrease in the rate of development of new cases. It is also probable that this reduction in incidence is one of the important causes of the decrease in tuberculosis death rates."

In spite of declining mortality and morbidity rates, much remains to be done if we are to think in terms of eventual eradication of tuberculosis. In 1952, state health departments were requested for the first time to classify newly reported cases on the basis of activity. In that year, 109,837 new cases were reported, of which 85,607 were classed as active or probably active. This is a case rate of 55 active cases per 100,000 population. It has been estimated that there are approximately 400,000 active cases of tuberculosis in the United States at the present time. The Division of Chronic Disease and Tuberculosis of the United States Public Health Service<sup>2</sup> recently reported results of their wide experience with x-ray film surveys conducted in all parts of the United States. In 17 community surveys in various cities and counties from coast to coast, 324,096 persons were examined, using 70 mm. photoroentgen films. Tuberculosis prevalence was found to be 13 cases per 1,000. Classified as active was 1 case per 1,000, questionably active 2 per 1,000, and inactive 10 per 1,000. Average experience from community wide x-ray film surveys was stated to result in findings as follows: For each 100,000 examined, the 70 mm. film will yield 2,202 cases of suspected tuberculosis. Adequate follow-up by means of 14 by 17 inch films and clinical evaluation will yield 99 cases of active tuberculosis and 617 cases in which the disease is inactive or activity is undetermined.

Since a high proportion of students at the University of Pennsylvania are residents of Philadelphia and New York, we are particularly interested in the prevalence of tuberculosis in these areas. Upstate New York provided chest x-ray

films for 228,418 persons on admission to general hospitals and found 13 per 1,000 showing evidence of tuberculosis or suspected tuberculosis. In community surveys involving 169,952 x-ray film examinations of persons over 15 years of age, 7 per 1,000 showed evidence of definite or suspected tuberculosis. Also worthy of note is the fact that of 4,379 newly reported cases of tuberculosis in upstate New York in 1952, only 33 per cent were designated as minimal in extent. Of these cases, 40 per cent were moderately advanced and 27 per cent were far advanced. Not since 1940 had there been such a high percentage of far advanced cases reported. The Philadelphia Tuberculosis and Health Association x-rayed 57,156 persons in surveys of various groups in the fiscal year 1952 to 1953. There were 740 persons, or 13 per 1,000, who showed x-ray evidence of significant tuberculosis. It has been estimated that there are 150,000 unknown or unreported cases of active tuberculosis in the United States. On the basis of such evidence, the control of tuberculosis in the future still presents a very real problem. Some states still have death rates far in excess of the rate of 15.5 for the country as a whole. In 1952, Arizona had a death rate of 42.0, the District of Columbia 28.1, Kentucky 27.5, and Tennessee 26.7. Excellent records occurred in 12 states, with death rates of less than 10 per 100,000 population. Minnesota was in this latter group with a total of only 208 deaths for the year and a death rate of 6.9. The recently reported active cases of tuberculosis in 1952 ranged from a high of 164 per 100,000 population in Arizona to a low of 16 in Nebraska. Universities and colleges in areas having high mortality and morbidity rates should provide adequate programs for the detection and control of tuberculosis among their entire personnel.

Tuberculosis mortality is becoming more and more concentrated in the older age groups, this being particularly true with reference to males. More than 70 per cent of all deaths from tuberculosis among white males now occur at age 45 and over; more than half occur after the age of 55. In 1900, 75 per cent of all deaths due to tuberculosis in the United States were in persons under 45 years of age, while persons under 45 years accounted for only 42 per cent of all deaths in 1950. The median age at death from tuberculosis advanced from 33.3 years in 1924 to 49.7 years in 1950. In spite of a relatively low mortality rate in young persons of college age, experience at many institutions indicates clearly that constant supervision will be rewarded by finding considerable numbers of students who have tuberculosis.

The University of California at Los Angeles provides a very adequate program of tuberculosis control under the direction of Dr. Gertrude T. Huberty,3 assistant director. Routine chest x-ray films are provided for all undergraduate and graduate students at the time of entrance, as well as for a large number of students who have subsequent periodic health examinations. Food handlers have annual chest x-ray films and all new employees have pre-employment chest films. With an enrollment of approximately 13,000 students, 12,209 chest x-ray films were taken during the school year 1952-53. This survey resulted in the detection of 22 persons having active tuberculosis, of whom 15 were students, 3 were employees, and 4 were food handlers. An analysis of 85 cases of active tuberculosis detected during the past six academic years revealed that more than one fourth of these were in persons over 30 years of agc. A total of 160 cases of inactive tuberculosis were also under observation on this campus during the year, 142 of these being students. A number of colleges and universities have found a greater prevalence of tuberculosis among foreign-born students and especially among Orientals. Therefore, it is of interest to note that at this California institution the enrollment included 1.023 foreign-born students. Of this group 31 were found to have tuberculosis, 5 having active disease. This is a case rate of 30 per 1,000 among foreign-born students, as compared with a rate of 10 cases per 1,000 native-born students.

The University of Washington, Seattle, provides one of the most complete programs of tuberculosis control to be found in any of our larger universities. Dr. Charles N. Lester<sup>4</sup> has kindly provided me with a detailed report of their activities. All students are required to have a chest x-ray film each school year. Each faculty member and employee must file with the university comptroller a certificate indicating freedom from tuberculosis in communicable form. Such certification must be renewed every two years. In 1952—1953, the university had a student enrollment of 10,497. During the year a total of 17,072 chest x-ray films were taken. Of these, 7 students were found to have active tuberculosis, 3 being members of the entering class. There were 112 students who had tuberculous lesions classified as inactive or arrested. In this group were 31 students in the entering class, 6 of whom had never previously been known to have had tuberculosis.

Many institutions have reported a significant decrease in the prevalence of tuberculous infection among their students in recent years. In 1933—1934, 14 colleges in various parts of the country reported the results of tuberculin testing of 25,184 students. The percentage of reactors was 30.3. In 1947—1948, among 128,757 students tested at various institutions, 15.8 per cent were reactors. At the University of Pennsylvania we have included the Mantoux intracutaneous tuberculin test in the examination of all male students entering our undergraduate and professional schools since 1931. The small number of women students have routine chest films without preliminary testing. In that year, 51.3 per cent of undergraduate freshmen reacted to the test, whereas only 14.2 per cent in 1953 were reactors. As recently as 1938, 71 per cent of our students entering medical school reacted to tuberculin, while in 1953 there were 20.5 per cent reactors. In a previous report<sup>5</sup> dealing with the prevalence of tuberculosis among students at the University of Pennsylvania, 177 students were found to have pulmonary tuberculosis during the fifteen-year period from 1931 to 1946. Of this number, 91 cases of the disease were among medical students and 86 cases were distributed among the students of all other schools. Thus, more than half of all cases of tuberculosis were in medical students, although they comprised only 9 per cent of our total student enrollment.

We are now completing our eighth school year since the period covered in this earlier report. During this time, 73 students have been found to have pulmonary tuberculosis, 39 had active disease, and 34 had inactive disease. Leave of absence is mandatory for all students found to have unstable lesions. Readmission to the university is permitted only after an adequate period of treatment resulting in satisfactory healing. Of particular interest is the pronounced decrease in the number of medical students who have developed tuberculosis during their four years of training. Since 1946, 11 students have acquired pulmonary lesions of the reinfection type. The disease developed in these students during the period 1946 to 1949. During the past five school years no medical student has developed tuberculous disease in any form. Moreover, supervision of this group has not been relaxed in any way. Chest x-ray films are required of all medical students at the opening and at the close of each school year. We have never used photofluorographic films of any size in our casefinding program, only the 14 by 17 inch films.

The annual attack rate of tuberculosis among our medical students reached a high of 2.1 per cent in 1938—1939, when tuberculous disease developed in 11 students. By continued, conscientious adherence to control measures which were carefully planned and put into practice seven years ago, it appears evident that the prevalence of the disease among students of medicine can be maintained at a level comparable to that prevailing in the student body as a whole. This level can be achieved only through the cooperation of all departments in preventing the exposure of students to all known sources of tuberculous infection.

The tuberculin test provides the only method by which we may accurately determine the degree of dangerous exposure to tuberculous infection in any such group. At the University of Minnesota, Myers<sup>6</sup> has recorded the rate of conversion to the tuberculin test for each graduating class from 1933 to 1953. A high percentage of students who were nonreactors became reactors to tuberculin in the early years. In the graduating class of 1936, 65.1 per cent of students converted to the test. During the past 10 vears, sources of infection with tubercle bacilli have been for the most part eliminated. The rate of conversion to the test has declined very substantially during this period. In the 1953 class, conversions were observed in only 3.6 per cent of students. Such improvement in the control of infection is naturally reflected in a pro-

nounced decrease in the incidence of tuberculous disease. During the past 11 years, tuberculosis developed in only 2 students. The University of Rochester Medical School<sup>7</sup> had a conversion rate of 80.5 per cent among students of the second year class during the period 1937—1943. A searching investigation indicated that the autopsy room and the pathology laboratory offered the only definite and repeated opportunities for infection. Rigid control measures were applied with the result that the attack rate of tuberculous infection among second year students was reduced by 95 per cent during the next four vears. The fact has been convincingly demonstrated, therefore, that the training of medical students need not be attended by an unduly high incidence of tuberculous infection and disease.

In future planning for the control of tuberculosis in colleges we must not become too optimistic because of the low mortality rate in the college age group. In 1950, the tuberculosis death rate in the age group 15 to 24 years was 4.3 per 100,000 white males and 6.6 among white females. The prevalence of the disease is known to increase with advancing age. In view of this fact, all faculty members and employees should be included in the college case-finding program. Since the number of such adult personnel reaches into the thousands at many large institutions, adequate campus control of tuberculosis is not possible unless these persons are as carefully supervised as are the students.

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## Eradication of Tuberculosis in Cattle

HOWARD R. SMITH

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In numerous articles which have appeared in newspapers calling attention to the greatly reduced human death rate from tuberculosis, mention is seldom made of the elimination of this disease from cattle as an important factor. Many in the medical profession do not seem to be fully informed as to what really has been accomplished during the past 36 years through the concerted action of the veterinary profession and others.

As one who has taken an active part in the educational program preceding and during the National Campaign of Eradication and in promoting the necessary federal and state legislation to make it succeed, I have been asked to prepare this statement regarding the plan of action and the results to date. A long time has been required to reduce the incidence of tuberculosis in the cattle of the United States 98 per cent because the disease had become so widespread and still is prevalent in many foreign countries. In fact, the disease first came to the United States through importation of purcbred cattle from Europe which were brought here to improve the quality of our native stock. This happened long before Dr. Koch discovered the tubercle bacillus in 1882, and later developed the tuberculin test which has proved so indispensable as a detector. The cattle brought to this country looked perfectly healthy and noone suspected that some were infected with such an insidious disease, which eventually spread from herd to herd across the nation.

I recall very clearly my surprise when, as an animal husbandry student under the tutelage of Dr. E. A. Grange, head of the veterinary department of Michigan State College, we did some pioneer work in 1894 and 1895 in applying the tuberculin test and found reactors among some of the best breeding cattle. Only after slaughter, when we saw the diseased lymph nodes, were we convinced they had tuberculosis.

HOWARD R. SMITH, an 1895 graduate of Michigan State College, was made Honorary Doctor of Agriculture by the University of Nebraska in 1944 in recognition of tuberculosis eradication. He received the Alumni Distinguished Service Award from Michigan State College in 1952.

Just how fast the disease progressed in the United States, we have no way of knowing, until 1906, when Congress passed an act providing for our present system of United States Meat Inspection. President Theodore Roosevelt appointed a committee of eminent physicians and veterinarians to draft regulations which have been in operation continuously since. These regulations are so thorough and exacting that not only are consumers of meat protected, but the records kept give us accurate information as to where in the United States and to what extent certain diseases exist.

During the fiscal year ending June 30, 1908, of all cattle slaughtered under federal inspection in the United States, 0.88 per cent were retained for tuberculosis, which means that that percentage showed lesions of the disease. The actual incidence was somewhat higher because in the early stages of the infection no lesions are visible. The per cent retained increased to 2.11 in 1917, when the eradication campaign started, which means the incidence of the disease more than doubled during that nine-year period.

Records of the Vital Statistics Division of the United States Bureau of Census show in 1900 the human death rate from respiratory tuberculosis was 180.5 per 100,000 population, which declined to 124.6 in 1917, as a result of improved medical care. However, the human death rate from nonrespiratory, such as lymph node, abdominal, and bone tuberculosis increased from 21.4 in 1900 to 22.5 in 1917. The increase in tuberculosis among cattle during that period, causing a greater exposure to man of the bovine type, would appear to have counteracted improved medical care.

The meat inspection records show a greater increase in tuberculosis among both cattle and hogs at the Chicago market than elsewhere. By 1917, out of 2,160,899 cattle slaughtered under federal inspection in Chicago, 4.3 per cent were retained for tuberculosis, and of that number .94 per cent of the total kill were condemned outright. Tuberculosis in hogs more than trebled in Chicago during the nine-year period preceding 1917. Hogs have both the bovine and avian types, the former from picking up droppings of

cattle in feed lots and from drinking infected cow's milk. The avian type in hogs results from the common practice in the Middle West of permitting poultry to mingle with hogs, which pick up germs in the droppings. Hogs are also infected with the human type. I recall one badly infected lot of hogs slaughtered in Birmingham, Alabama, which had access to the outlet of a sewer from a state asylum.

Not only the heavy losses from condemned meat, but also the increase each year threatening the future of the livestock industry caused much concern among the Chicago packers. Through the leadership of Thomas E. Wilson, then president of Wilson & Company, a fund was subscribed by the various market interests at Chicago, in which the western railroads assisted for the purpose of taking definite action.

Perhaps because of my previous experience in the educational field, I was asked to give my entire time to the new project, started January

1, 1917.

The meat packers, United States Bureau of Animal Industry, and state livestock officials were aware of the increase of tuberculosis in cattle and hogs, but the general public, including farmers, was not. Our early publicity was confined largely to farm papers, for if we had sent articles to the metropolitan press, the consumption of meat might have been discouraged. In fiscal 1917, there were 20,293 cattle, .94 per cent of the total kill under federal inspection, and 25,791 hogs, or .34 per cent of the total kill condemned for tuberculosis in Chicago alone. Of all cattle killed under federal inspection in the United States in fiscal 1917, .43 per cent of the total kill were condemned. The hog condemnations in the United States in that year were .19 per cent of the total killed.

In our early publicity, we stated that cattle and hogs condemned for tuberculosis in Chicago alone in 1917 would fill a stock train 10 miles long and in the entire country, a train

22 miles long.

We traced many shipments of tuberculous cattle and hogs back to the farms of origin and the owners and state officials were notified. The usual reply from the state veterinarian was, "Funds insufficient for tuberculin testing such farms." The need for new legislation, both federal and state, carrying appropriations for applying the tuberculin test to cattle became apparent.

At the first hearing before the House Agricultural Committee, January 14, 1918, to consider a bill carrying an appropriation of \$1,000,000, the statement was made that tuberculosis in

cattle could not be eradicated without partial reimbursement on reactors slaughtered. Many purebred herds were so badly infected that the owners would not permit the tests, knowing that such tests would mean financial ruin. Further emphasis was made of the fact that the disease in cattle can be transmitted to people, and every taxpayer should be willing to pay a share of the cost. The bill finally passed both houses carrying an appropriation of \$500,000. No state could receive a share of this amount without providing at least as much. Several states appropriated more, which made it possible to employ a large force of federal, state, and local veterinarians to conduct the tuberculin test.

Each year until 1928, we arranged for hearings attended by representatives of national and state farm organizations, to get increased funds until the federal appropriation reached \$6,300,000. By 1928, the state funds doubled that amount. During the first few years, the testing was largely under the accredited herd plan, mostly purebred cattle, which were often infected to a greater degree than grades and were more widely distributed.

The area plan, whereby all breeding and dairy cattle in entire counties were tested, was started in Hillsdale county, Michigan, in 1922, where the board of supervisors made the first county appropriation in the nation for this purpose. In order to stimulate this plan of action, all of the leading packing companies consented to pay a premium of \$.10 per hundred on hogs produced in accredited counties, so designated when on the last test less than .5 per cent of all cattle tested reacted. This was the average loss on all hogs in the United States at that time. The area plan of testing offered great possibilities for the eventual eradication of the disease. The state officials required that before a county could undertake area testing, a substantial majority of the cattle owners must sign petitions approving it. Otherwise much opposition would arise. Obviously much educational work had to be done. The National Livestock Sanitary Committee in Chicago authorized me to engage a qualified man for the educational work in the Chicago territory, while I visited other markets to raise funds for hiring so-called livestock commissioners to give their entire time to educational and promotional activities in cooperation with federal, state, and local veterinarians. Funds were subscribed by the various market interests and qualified men were employed at South St. Paul, Minnesota; Sioux City, Iowa; Omaha, Nebraska; St. Joseph and Kansas City, Missouri; East St. Louis, Illinois; and Milwaukee, Wisconsin, all work to be coordinated through the Chicago office. County after county, and finally state after state became officially accredited, the last being California in 1940, where as elsewhere much opposition had to be overcome.

The importance of eradicating tuberculosis from cattle in its relation to public health was always given much emphasis. My most profitable day from a publicity point of view was in 1922, the Paris, Illinois case (figure 1), where



Fig. 1. Photograph of 7 farm children, 5 of whom contracted bovine type of tuberculosis. In 4, the disease was in the lymph nodes. In 1 boy, the skin was involved. The oldest girl, who did not drink cow's milk, and the nursing baby escaped the disease. When slaughtered, the family cow was found to have the disease in lungs, liver, and udder.

5 out of 7 children contracted tuberculosis from the family cow. The only 2 who escaped were a nursing baby and a 14-year-old girl who did not drink milk. The cow was among a herd which had been tested. The original owner sold it as he did not believe that such a healthy Jersey cow, even though it had reacted, could have the disease. We invited physicians to witness the slaughter of the cow, which was a generalized case, with the udder involved. On that same day, the original owner, who had violated the law by selling the reactor, was located and later fined. Not only the children, but the pig and family cat had contracted the disease. Cats do not take the human type but do the bovine.

Another great help from the medical viewpoint was the passage of city ordinances requiring milk to be produced from cows without tuberculosis. Some county boards were not disposed to make further appropriations to supplement federal and state funds after a county was accredited. Of course, the test had to be continued after accreditation in order to bring the percentage reacting still lower. I met many members of city health boards and secured their cooperation in

requiring that not only milk but butter must come from tuberculosis-free cows. Any county discontinuing testing after accreditation, lost its status and then its market for butter. On the butter wrapper was printed: "Made of cream from tuberculin-tested herds in officially accredited areas." These regulations were additional safeguards to public health and did much to persuade county boards to continue appropriations in order to maintain the accredited status indefinitely.

What have been the results of repeated testing of all breeding and dairy cattle in the United States? The country has been virtually raked with a fine tooth comb to detect and destroy cattle that were infected with tuberculosis. In 1918, out of a total of 134.143 cattle tuberculin tested in the United States, 4.88 per cent reacted. As the number tested increased each year with larger appropriations, the percentage reacting decreased. Nearly all reactors were slaughtered under federal inspection soon after being tested. The premises where reactors were found were thoroughly cleaned and disinfected under federal or state supervision. In 1935, there were 25,237,532 cattle tuberculin tested, of which 1.5 per cent reacted. The United States Bureau of Animal Industry reports that of 9,675,245 cattle tested in fiscal 1953, 0.11 per cent reacted, a decrease of 97 per cent in proportion to the number tested since 1918.

United States Meat Inspection records show that of 15,204,998 cattle, exclusive of reactors, slaughtered under federal inspection in the United States during the fiscal year ended June 30, 1953, .009 per cent were retained because of tuberculosis, and .0025 per cent of the total kill condemned, as compared with 2.107 per cent retained and .4392 per cent condemned in 1917. In proportion to number slaughtered, this means a reduction of 99.5 per cent in retentions and 99.4 per cent in condemnations since 1917. The two reductions are so close together, we may infer that only the bovine type causes the disease in cattle. In hogs, the facts are entirely different. Swine retentions in the United States increased from 9.89 per cent in 1917 to 13.54 per cent in 1927, due to the great increase in tuberculosis in poultry. The decrease in hog retentions from 9.89 per cent in 1917 to 4.29 per cent in 1953 is a reduction of only 57 per cent, and since 1927, only 68 per cent, in proportion to number slaughtered. However, hog condemnations have decreased 92 per cent since 1917, because the bovine type is a much larger factor in causing hog condemnations than the avian

type from contact with infected poultry, which causes more lesions to be localized in the throat

lymph nodes of hogs.

Much stress has been given to the importance of disposing of all chickens at the end of the first laying year, because pullets have so little tuberculosis as compared with chickens over 18 months of age. Furthermore, hens lay from 20 to 30 per cent more eggs the first laying year than the second. The present trend toward young flocks is the principal cause of the decrease of tuberculosis in both poultry and swine. A few cases have been reported in which people have contracted the avian type. However, so many poultry flocks are infected that many more people would have the disease if the avian type were an important cause.

A significant fact is that from 1917 to 1952, the human death rate from respiratory tuberculosis has dropped from 124.6 per 100,000 population to 14.7, a decrease of 88 per cent, and from nonrespiratory 22.5 in 1917 to 1.4 in 1952, a decrease of 94 per cent.

The United States is the first nation in the world to have nearly completely eradicated tuberculosis from cattle. Some other countries have achieved a fair degree of success. The wholehearted cooperation of many agencies in the United States, such as the industrial leaders at our market centers, national and state agricultural organizations, the veterinary and medical professions, state and county officials, and the progressive farmers have made this accomplishment possible.

A STUDY of mortality rates of the state of Iowa indicates a definite shift of tuberculosis to the older age group, according to Walter L. Bierring, M.D., of Des Moines, Iowa.

In 1920, 33.8 per cent of 1,153 tuberculosis deaths occurred in those between 45 and 85 years of age or over; in 1949, 1950, and 1951, 64 per cent of 597 tuberculosis deaths occurred in those between 45 and 85 years of age. The mortality rate from tuberculosis has decreased to a sixth of what it was in 1920, however. About 10 per cent of those dying from tuberculosis in 1920 were over 65, whereas in 1950 about one-third who died from tuberculosis were over 65. The median age of the group which died from tuberculosis in the last 30 years has increased significantly over the median age of the total population of the state.

The peak rates which prevail in the older age group are interpreted as a reactivation of tuberculosis lesions acquired early in life. A sharp decrease in the number of positive reactors to tuberculin in younger age groups is being

noted in the United States in recent years.

The shift of tuberculosis to the older age group constitutes a public health hazard because of the mildness of symptoms or the reluctance or inability on the part of the elderly individual to have adequate investigation for tuberculosis carried out.

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## BCG Is Still in Experimental Stage\*

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It intention in this paper is to discuss possible objections to the generalized use of BCG. The World Health Organization is trying at present to have this vaccination made compulsory in Egypt, after failure of its 1949 campaign.

BCG is a live vaccine, and like all vaccines made from living organisms, is apt to become contaminated during its preparation, leading to catastrophes similar to the 1930 Lübeck disaster in which 77 children died from tuberculosis. The freshly prepared liquid vaccine, recommended by the Danes and by WHO, has to be used within eight days after its preparation, although seven weeks must elapse before the degree of virulence of the batch can be ascertained by guinea-pig inoculation. This, of course, could be overcome by using the freeze-dried vaccine recommended by Van Diense<sup>1</sup> in 1951, or one prepared from the vole bacillus, as the latter is almost avirulent to humans and cattle, whereas the virulence of BCG can be lowered or enhanced according to the length of time it is subcultured on Sauton medium.

#### COMPLICATIONS OF BCG

In Egypt, the World Health Organization BCG campaign propaganda agents repeatedly gave statements to the press, in 1949 and again this year, bluntly denying the occurrence of complications of any description after administration of BCG. Calmette cold abscesses complicating this vaccine are known to occur in 19 per 1,000 in the age group below six years, when it is given intradermally by experienced injectors.<sup>2</sup> In Malta, 21 cold abscesses were recorded among 54 cases of adenitis by Zammit-Tabona.<sup>3</sup> Adenitis occurred in 50 per cent of children vaccinated in the thigh instead of the arm, and inguinal cold abscesses were recorded in 50 instances by Gaisford and Griffith.<sup>4</sup> Adenitis was observed in 732 cases, that is 5 per 1,000, in Czechoslovakia by Galliova and Gutmanova.<sup>5</sup> Krohn<sup>6</sup> found this condition also occurred in 10 per cent of those inoculated with some batches of BCG. Ulceration and adenitis

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were recorded by Courcoux. James described an axillary cold abscess, the pus of which contained acid-fast bacilli, after administration of BCG. In Egypt, possibly the reported low incidence of abscess formation after BCG vaccination since 1950 was partly due to exposure of the vaccine to direct sunlight,9 but was mainly attributed to the impossibility of collecting accurate statistics, especially since adenitis and suppuration occur late—sometimes seven months after vaccination, 10 and not necessarily at the site of the injection, so that the victims do not associate the late complication with the earlier injection. Moreover, the average Egyptian peasant is not usually anxious to take the trouble to notify the statisticians, so that their statistics may be accurate! I have received many letters from parents of school children who were inoculated, and even from government doctors who injected BCG describing the occurrence of these abscesses in Egypt. It is regrettable that the poor peasants were not informed of the true nature of the vaccination, but were told instead, it was a "health-giving" injection.

It is a pity that an organization such as the WHO, which has done splendid work for humanity in fields like venereal disease control, plague, typhus, malaria, and so forth, supports a vaccine of doubtful value and which is still in the experimental stage.

#### BCG CAUSES PULMONARY INFILTRATION

Though BCG cold abscesses are troublesome since they do not heal sometimes for as long as six months or more, they are only local or focal complications. Until last year, generalized affections following administration of BCG were unknown, or not looked for because of the intense propaganda for this vaccine. Pulmonary infiltration after BCG vaccination is now on record. Richards and Steingold<sup>11</sup> described enlarged hilar and paratracheal nodes, with mottling of the lower two-thirds of both lungs, following administration of BCG. James<sup>8</sup> recorded an axillary node abscess accompanied by extensive tubercu-

<sup>\*</sup>Read before the Sixth International Congress of Microbiology, Rome, September 9, 1953.

lous pulmonary infiltration of the upper lobe of the left lung in a 7-month-old female baby, two months after administration of BCG. Kringelbach<sup>12</sup> finds difficulty in diagnosing naturally occurring pulmonary tuberculosis, because of lung infiltrations observed in persons who have received BCG.

Dubos<sup>13</sup> produced progressive and sometimes killing tuberculosis with BCG administered to mice on deficient diets. Vorwald and associates<sup>14</sup> introduced BCG into silicotic guinea pigs which caused progressive and fatal tuberculosis.

Hauduroy and Rosset<sup>15</sup> produced fatal tuberculosis in normal golden hamsters with BCG, and Hauduroy has found it causes disease in

normal ground squirrels.

Gernez-Rieux and associates<sup>16</sup> proved that BCG does not remain at the site of administration, and found that after it was administered by the scarification method, these organisms were present in the spleen within eleven days.

Suter and Dubos<sup>17</sup> studied BCG cultures from a number of laboratories and found that all of them contained multiple bacterial forms. These various forms, when cultured, varied considerably in their invasiveness of animal tissue. Thus, these cultures designated BCG are of unknown composition.

## ISOLATION BEFORE AND AFTER BCG VACCINATION

Calmette recommended this procedure because, if omitted, illness running a serious course sometimes developed in those vaccinated and then exposed to infection before full development of the "immunity." The Ministry of Health in England recommends six weeks' isolation if the tuberculin test is negative and another six weeks after the vaccination, if the second tuberculin

testing is still negative.

Unfortunately, no attempt has ever been made to isolate before and after vaccination in the BCG campaigns earried out by the WHO, not because of the uselessness of isolation, but beeause of the difficulty of application. If it were possible to isolate a small group of people in a place where the attendants were free from tuberculosis, how could it be possible to isolate a whole nation during large scale vaccinations! Wilson<sup>18</sup> found that even if infants of tubereulous parents are separated from their families immediately after birth, their contact with each other almost always leads to cross infection with serious pulmonary and intestinal affections. That is why pediatricians prefer to treat infants in their homes, and do not admit them to hospitals unless absolutely necessary.

## "COUNTRIES" IN WHICH USE OF BCG HAS BEEN GENERALIZED

The use of this vaccine has neither been generalized nor made compulsory in England or the United States. Gernez-Rieux and Le Bourdellès<sup>19</sup> reported that even in France tuberculosis dispensaries are unpopular, as parents object to taking their children to them, even if care is taken that tuberculous patients are never present during vaccination sessions. Even in the Nordic countries, Denmark, which manufactures the vaccine on a large scale, Sweden, and Norway, there is no scientific proof that BCG has been of benefit, as I shall explain later. That some central European countries, such as Poland, Czechoslovakia, and the Balkans, allowed WHO to use BCG in the years immediately after World War II is not strange, since these war-stricken countries could not afford to refuse medical help of any kind, however futile it might be, especially when given through the Red Cross.

The following "countries" remain which allowed WHO to use BCG on a large scale. They are: the Belgian Congo colony, New Caledonia French colony, French West Africa colony, Fiji and Trinidad, Hong Kong colony, Malta, Ceylon, Burma, Yemen, the Palestinian Arab refugees,

and Israel.

#### BCG OPPONENTS

In France, Professor Ramon<sup>20</sup> deplores the generalized use of BCG. He says the disadvantages of any "live" vaccine are innumerable, that BCG is not stable and cannot be tested before use, that tuberculin conversion from negative to positive is no indication of the degree of immunity conferred, and that much research is needed in this field. Maigre<sup>21</sup> has also attacked BCG.

In the United States, BCG has many opponents who point to better results in tuberculosis control over large areas where BCG has not been used than in areas where it has been administered. Their excellent results are attributed to methods of finding cases, isolating contagious patients in hospitals and sanatoriums, and protecting the people from tuberculosis in animals. E. R. Levine<sup>22</sup> says BCG is still in the stage of investigation, that there is no scientific evidence to prove it controls tuberculosis, and that no agreement has been reached on matters such as the method of preparation of the vaccine or how to measure resulting immunity. M. I. Levine and associates23 proved the uselessness of BCG in New York City. Among 556 infants who were vaccinated in 1933 and observed until 1946, 8 died from tuberculosis, whereas among 528 who were not vaccinated, 8 died.

These workers<sup>24</sup> surveyed 601 adolescents who had received BCG in infancy and 564 controls. They found that none of the controls had developed tuberculosis, but 2 of those vaccinated in infancy had pulmonary tuberculosis of the lung in adolescence. They concluded, "There is no evidence to indicate that BCG given in infancy is capable of preventing reinfection tuberculosis in adolescence."

In England, where BCG is now being tried on a small scale in the form of a controlled scientific experiment, Professor G. S. Wilson attacked BCG both in Topley and Wilson's Principles of Bacteriology and Immunity, and before the International Conference of Physicians in London on September 12, 1947.18

Even in Scandinavia, there is no scientific proof that the decline in mortality from tuberculosis has been due to the use of BCG, since mortality rates from tuberculosis have decreased

more in parts of the world where BCG has not been used.<sup>25,26</sup> In Iceland, rates decreased from 203 per 100,000 in 1929 to 12 in 1952 without the use of BCG. Even in cattle, controlled tests in the United States and Canada failed to show any practical value in BCG.27

Aronson and Palmer's controlled experiment which was done on 1,551 Indians<sup>28</sup> tells of 12 deaths from tuberculosis in the vaccinated group and 65 in the control group. Thus, BCG does not necessarily protect those who receive it either from contracting tuberculosis or even from dying from it.

The generalized use of BCG should be stopped until proof can be shown of its safety and effectiveness. More lives would be saved by further research on chemotherapeutic agents than by emotional enthusiasm for a vaccine of doubtful value which has been employed since 1908, but which is still in the experimental stage.

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## Tuberculosis in Infancy and Childhood

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THE FINDING of tuberculosis, in one form or another, in a child or an infant is a tragic example of neglect or ignorance. Nothing can cause more consternation in parents, relatives, and civic-minded individuals than to have tuberculosis develop in a child.

Such a circumstance may arouse any variety of emotions and civic actions, some good, some bad, some sporadic, and some permanent. We know the incidence and severity of tuberculosis in children reflects the tuberculosis situation in their locality. Also the social, economic, and educational level of the home is reflected. Every tuberculous child is a morbid example of our negligence in exercising today's readily available tuberculosis control measures. We have been negligent in protecting him from contact with those suffering with the disease, and keeping his food free from contamination by tubercle bacilli either of human or bovine origin.

Dr. J. Arthur Myers has said, "No greater help can be given to a child than to prevent his body from becoming contaminated with tubercle bacilli." Prevention of tuberculosis in children depends directly on: First, control of tuberculosis in the parents and other adults with whom the child comes in contact; second, control of tubercle bacilli in food, especially dairy products.

This simple summary of facts to the parents of an afflicted child usually reveals the ignorance and misconceptions prevalent regarding tuberculosis. Health education regarding tuberculosis is greatly needed. For example, often heard are the misconceptions that we are all born with the germ and that it is inherited. We do not have the germ in our body unless after birth it is taken in through one of the several portals of entry.

That tuberculosis is inherited is a common misbelief due to its frequent occurrence in several members of the same family, and the fact that several generations may be afflicted before the disease is brought under control. This emphasizes the need for unremitting observation

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and examination of family contacts. There is no evidence to show that a father suffering from tuberculosis transmits the disease to his unborn child. But, there is much evidence to show that the tuberculous father can infect the child if he deliberately or unwittingly stays with him after he is born. Likewise, tuberculosis is not inherited from the mother. Fortunately, nature provides a fairly reliable barrier, the placenta, between the maternal and fetal circulations, which under ordinary circumstances prevents tubercle bacilli from entering the unborn child's blood stream. As a result, congenital tuberculosis only occurs under unusual circumstances. Unfortunately, after the child is born and the tuberculous mother attempts to nurse and care for the child, infection cannot be barred either by way of the respiratory or digestive tracts.

While we do not advocate pregnancy in women with active tuberculosis, we feel they should be given every advantage of modern tuberculosis and obstetric care. The best state of health possible must be obtained for them, and they do extremely well under modern treatment. If the infant is removed from his mother immediately after birth, he, too, does well.

Tuberculosis results from either direct or indirect contact with persons or animals suffering from the disease in an active form. While not as contagious as measles, the disease is definitely transmissible by the afflicted, a fact established by Villemin in 1865. An apparently healthy person or animal may transmit the disease. These so-called healthy carriers are those who unwittingly expose others to their disease, and are one of our greatest remaining obstacles to complete eradication of the disease. This lack of knowledge regarding one's health can be avoided by taking advantage of the mobile chest x-ray survey unit's services when it comes into the community and by regular periodic examinations by the family physician. This examination by the physician should include an x-ray film of the chest. Likewise the physician should avail himself of the benefits of routine hospital admission chest x-ray films. The fact is well known that the cost per case found by this method is relatively trivial as compared to the cost per case

found by community wide mobile unit surveys. Most of our larger hospitals have these units, but unfortunately often only a small percentage of admissions receive chest x-ray films. Likewise, only a small number of family physicians routinely take x-ray films of the chests of patients in their offices.

Although these people seeking hospital or office medical care may have no appreciable symptom referable to their chests, the miniature x-ray film shows a surprising amount of otherwise unsuspected tuberculosis or other chest pathology.

The animal carrier, the most important of which is cattle, has been quite well eliminated through the efforts of veterinarians and public health officials. Through years of hard work and controversy, every county in the United States has had tuberculosis in cattle reduced to an extremely low figure. This reduction was brought about by thorough and meticulous examination of herds and the use of the tuberculin test. The obviously ill cattle and even those showing just a positive tuberculin test were destroyed. This procedure, of course, must be repeated periodically as the cattle may be infected at a later date by not only the bovine strain of tubercle bacillus but also the human strain. In this instance man infects cow instead of cow infecting

These measures of eradication of tuberculosis in cattle and the pasteurization of milk have contributed greatly to the decrease of tuberculous infection in children.

Fortunately, we are able to show the value of these rather drastic measures not only to the livestock industry but also by the substantial reduction of human suffering from bovine strains of tuberculosis. Yet, often a child can be found with tuberculosis of lymph nodes of the neck or tuberculosis of the bone, involving the spine, hip, or knee, who has been fed whole raw milk from a cow whose tuberculosis test is not known. In some states, the sale of unpasteurized milk for human consumption is now illegal. As a result, raw milk is offered for sale as "cat and dog" milk.

No doubt, to destroy an apparently healthy animal which has only a positive tuberculin test seems unnecessary and wasteful. Yet our veterinarians have been adamant on this point as they have long recognized the latent grave potentialities as revealed by the positive tuberculin test.

The tuberculin test is a simple skin test performed by introduction of products of the tubercle bacillus including the tuberculoprotein fraction of the bacillus into the skin. The positive reaction reveals the fact that previous infection has taken place. When infection has not taken place or has occurred so long ago that sensitivity or allergy to the products are lost, the test will be negative. The positive test merely indicates that contamination has taken place and the animal either has had an infection or has an active infection at the present time. Since tuberculosis does not occur in an animal without contamination by the germ, the negative reactor is saved and the positive reactor, which has all the potentialities of being sick, is destroyed.

The same situation prevails in the child. Grave potentialities are revealed by the positive tuberculin test. After contamination takes place, the outcome cannot be predicted. Many times casual exposures do not produce infection, since the germs are cast off in body secretions before they take root. However, when tubercle bacilli enter the body in sufficient numbers to excite the body's defense mechanism, a tissue reaction takes place which is a first-infection type of reaction. Fortunately, body defenses are so good that usually the germs are walled off in microscopic areas, and the child has no obvious illness or possibly the illness is mistaken for a "cold" or "bronchitis."

This reaction can take place anywhere in the body and may occur at several sites at the same time. However, tuberculosis in children seems to have a predilection for lymph nodes in the neck and chest and, sometimes, also in the bones and joints. As a rule, reaction to the first infection is mild enough to pass unnoticed and usually no abnormalities are noted on physical examination. If the reaction takes place in the chest, an x-ray film taken at the right time may show a small patch of pneumonia in the lung or an enlargement in the hilus, and much later, the x-ray film may show a small area of calcification. The tuberculin test becomes positive within three to seven weeks after the tubercle bacilli enter the body. Thus, we have a proficient and early diagnostic test.

The immediate outlook for first-infection type tuberculosis is good and as a rule nothing more is needed than observation for symptoms and changes in the x-ray films. Sometimes examination of the contacts the child has had reveals the source of infection to be from a hitherto unknown case of tuberculosis. This possibility adds to the value of the tuberculin test as a tool for early diagnosis if properly followed up.

Obvious primary or the first-infection type tuberculosis must always be considered and treated as a serious disease. A mortality rate of 23.9 per cent or 149 deaths is reported in a consecutive series of 622 cases studied in the Bellevue Hospital Children's Chest Clinic by Edith M. Lincoln.¹ This study covers the years 1930 to 1940 and points out the need for continued observation for complications and the groups in the greatest need for treatment. Approximately 90 per cent of the deaths occurred within one year after diagnosis.

The sites of first-infection type tuberculosis frequently contain live bacilli for a long period of time, making reinfection possible at any time when conditions become favorable for the bacilli to break out of the original walled-off areas. In addition to this, first infection conditions the body to a different type of reaction to subsequent infection with tubercle bacilli, which is called reinfection type of tuberculosis. The response is allergic and, instead of being that of protective immunity, is more destructive and fulminating and produces the type of disease we feel needs sanatorium care. Since reinfection type occurs more often after childhood, it is sometimes spoken of as an adult type of tuberculosis. However, age is not a factor as the disease develops when the individual is exposed to tuberculosis. The interval between the two types of disease is variable from days to many vears.

These complicated first infection and reinfection types of disease urgently require treatment, and unfortunately in some forms carry a grave prognosis and produce permanent crippling.

Instead of the usually microscopic or small area of involvement, as seen in the uncomplicated first-infection type, the reinfection type produces pronounced changes that cast visible shadows on x-ray films, and, sooner or later, the patient has symptoms and is ill. Likewise, the reinfection type may have obvious findings on physical examination. However, symptoms and positive physical findings are not early signs.

Such grave forms of the disease as meningitis, miliary tuberculosis, and tuberculous pneumonia are examples of the reinfection type of disease and are always preceded by the first-infection type.

Tuberculous pleurisy with effusion, bone and joint tuberculosis, tuberculous otitis, tuberculous peritonitis, and sometimes tuberculosis of the lungs in children are also examples of the reinfection type. All of these illnesses need active treatment in a hospital or tuberculosis sanatorium, which has facilities for isolating the child from adults who have the disease. We are all aware of the dramatic results now afforded by rest, isolation, drug, and surgical therapy.

Before the advent of modern drugs, namely: streptomycin, para-aminosalicylic acid, and isoniazid, tuberculous meningitis and miliary tuberculosis were almost 100 per cent fatal. Other forms of tuberculosis involving lymph nodes, bones and joints, larynx, bronchi, kidney and other parts of the genitourinary system, eyes, ears, and skin are also helped greatly by drugs. The reinfection type of pulmonary tuberculosis in the child requires the same treatment as in the adult with some variations necessitated by the age of the individual. This is especially true in selecting surgical treatment.

Prevention of tuberculosis in childhood is our only hope for eradication of this serious disease. Strict use and wider application of present day tuberculosis control measures, which are available and in use at the present time, offer our best possibility of total eradication. Unremitting efforts are needed for total eradication. Rearing a child in an environment free from tubercle bacilli is our only means of avoiding first-infection type tuberculosis and the potentiality of the reinfection type in the child, adolescent, and adult.

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## Tuberculin Testing

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Within the last decade an unusual transformation has occurred in the field of tuberculosis management. Not only have tremendous strides in the treatment of the disease occurred, but also tremendous improvements in the methods used in its detection. Now the statement can be made with reasonable assurance that the majority of all patients found to have tuberculosis can be guaranteed an arrestment of their disease providing they follow the program of treatment outlined. A new type of responsibility accompanies the declining death rate and the increase of arrested cases returned to society; that of maintaining a careful watch over these individuals to be sure that their disease does not reactivate or spread to others. At the same time, an extremely active campaign is being conducted to discover new cases. Newer technics, including the 70 mm. photofluorogram, are being used to survey large groups of individuals. Photofluorographic methods have made possible the detection of tuberculosis cases in earlier stages and in larger numbers than heretofore was possible. In many instances, this method of roentgen-ray examination has almost completely supplanted the older methods. In the following paragraphs I wish to view this over-all picture especially in relationship to tuberculin testing, with the hope of discouraging the premature abandonment of this valuable procedure.

In recent years the question of tuberculin testing has been the basis for considerable argument, especially in public health circles. With the advent of the 70 mm. photofluorogram, many felt that tuberculin testing was outdated and that the photofluorogram would supplant it as a case-finding method. These arguments, in general, have been based on statistics showing the number of cases of active tuberculosis discovered by the photofluorogram method as compared with similar series examined by the tuberculin test method, and by comparing the feasibility of one type of examination as opposed

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to the other. Now, after some experience with 70 mm. films, we are finding that this method is subject to substantial error and also that the cost of the photofluorogram procedure may not be less expensive than the tuberculin test method.

The fact that the tuberculin test method is the more accurate should be apparent. Few tests in medicine are as specific and as dependable as the tuberculin test. The tuberculin test method, with very few exceptions, can reveal whether a person has ever had contact with the tubercle bacillus. This is obviously not possible by the photofluorogram technic and brings several factors into consideration.

If we are to approach tuberculosis from the standpoint of eradication and from the standpoint of the very best that we know in prevention, tuberculin testing must be recognized as the best screening method that we have. This technic can detect the presence of tuberculous disease at a time when it cannot be readily recognized by photofluorograms or other clinical means. It may also act as an extremely important guide to subsequent examination and management of a given case. A knowledge of conversion of a tuberculin reaction and the time of conversion makes it possible to set up a program of prevention and careful follow-up before the disease has become communicable and even before any significant inroad has been made on an individual's health. Serial tuberculin testing can "pin point" the time and place of infection and evaluate with great accuracy the time and the need for treatment. This, of course, is much more important when considering tuberculosis in children as compared with tuberculosis in the adult. Changing tuberculin reactions are much simpler to evaluate over a short span of years than over a number of years. Notwithstanding, the importance of tuberculin testing in this latter group cannot be denied, and extremely accurate preventive campaigns can be conducted by the over-all use of this method as a number of our good college survey programs have shown.

As better control of tuberculosis develops through methods of treatment and prevention, the incidence of positive tuberculin reactors will decrease until the relative number of positive reactors is small enough so that tuberculin test methods of case detection becomes more feasible. Obviously, if we have only a small fraction of 1 per cent new, positive reactors each year, more time and effort can be spent in the control of tuberculous disease within that small reacting group. A truly preventive program can thus be instituted. If the 70 mm. film program is used, "pin pointing" of prevention and control is impossible, especially when it applies to school children and adolescents. Because of these considerations, I have always been an exponent of tuberculin testing in school groups and have advocated this method on a routine basis for all preschool children as well.

While the tuberculin test method is still impractical for the population at large, there are numerous groups for whom the method can be used with a great deal of accuracy and with no greater expense than use of the 70 mm. films entails. College, high school, and grade school groups are particularly good examples. In practically all grade school, high school, and college classes a gradually declining rate of tuberculinization has occurred, and only a fraction of 1 per cent new positive reactors are added annually. Thus, the evaluation of these groups can be managed easily, since only a few individuals with positive reactions need be followed on a regular basis. Some of the points which I believe favor tuberculin testing in selected groups are:

1. The tuberculin test method has an educational value, especially in school groups. Although this point has been denied, if the test is properly introduced and handled, a lasting educational value can result.

2. Tuberculin testing is a definite case-finding method and many cases of active tuberculosis are discovered. This fact is shown, I think, quite well in the article "Value of Tuberculin Skin Testing as a Case-Finding Procedure" published in the April 1953 issue of The Journal-Lancet by Dr. A. A. Pleyte, Doris Kerwin, and Duane Sternitzky. Its superiority as a case-finding method in school children can be based upon the fact that it discovers tuberculous disease at a time when 70 mm. films show no evidence of pulmonary involvement.

3. The tuberculin testing type of program is a statistical index of the degree to which tuberculosis is controlled in the community, which is far superior to other methods of study. This is particularly true now that the mortality rates are being so sharply curtailed with the use of the newer drugs.

4. If the incidence of tuberculinization of a community is low, tuberculin testing is far less

expensive than the 70 mm. films or other case-finding methods, since only a small portion of those tested need to be followed by extensive study.

5. The last important point, I believe, is that pertaining to the medical history of any individual. The past tuberculin test history often is an important point in deciding the diagnosis. In my estimation, the point of conversion of tuberculin reaction cannot be stressed too strongly. If the time when an individual converts a tuberculin reaction can be determined, it is possible also to "pin point" a more definite and frequent follow-up period. Here again is recognized the fact that most of the significant tuberculosis following conversion of a tuberculin reaction occurs within a two-year period after conversion of the reaction. This, of course, is not a hard and fast rule but makes a good index on which to base the frequency of follow-up examination.

Considering all of these points, I feel that the tuberculin test should be given reemphasis as the best method of examining some groups of individuals for tuberculosis. This, I believe, particularly applies to the school group and to other closely knit groups which lend themselves to regular examination of this type. Naturally, if tuberculin testing could be applied to the entire population, it would be an ideal method of approaching the eventual eradication of tuberculosis in human beings. This method has been successfully used in animal husbandry. Unfortunately, the organization of human society does not lend itself as well to universal tuberculin testing, and obviously the 70 mm. photofluorographic technic is valuable for examining large groups of the population.

I feel that 70 mm. photofluorograms have been used far too frequently as a means of supplanting the tuberculin test in our schools, and that thereby a very valuable tool in the evaluation and control of tuberculosis has been lost. Tuberculin testing should be most feasible used in practically all school systems as the basic method of case discovery for tuberculosis, with the 70 mm. film technic used as an occasional supplementary method of examination. Photofluorograms are of additional value in detecting conditions which are nontuberculous. This value should be considered, but not to the extent of weakening the tuberculosis program. I remember a case of a high school girl who was found to have far advanced pulmonary tuberculosis during an annual photofluorogram survey. She had had a negative x-ray film seven months before. If this child had been tested with tuber-

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# Use of the Routine Tuberculin Test in Infancy

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Two Years ago a leading pictorial news weekly depicted dancing in the wards of one of the large tuberculosis sanatoriums. A new drug, now called isoniazid, promised cure for tuberculosis sufferers.

That isoniazid, streptomycin, and para-aminosalicylic acid have been beneficial in the treatment of tuberculous disease cannot be disputed. However, case finding continues to be the most important approach to the control of tuberculosis. This is accomplished not only by means of routine chest x-ray films of adults but also by use of the routine tuberculin test, particularly in

young children.

Brailey<sup>1</sup> has shown that children infected with tuberculosis under 3 years of age bear a serious prognosis. Further, she has indicated that the first year after the demonstration of tubérculous infection is most important. Secondary tuberculous disease usually develops soon after the postprimary period of infection. Therefore, a routine tuberculin test performed by the medical practitioner on each infant who comes under his care would seem wise. With such information at hand, the physician would be in a better position for careful follow up of those infants infected with tuberculosis. Prompt recognition of complications would allow immediate institution of proper chemotherapeutic agents and thereby promote a more favorable outcome.

At first glance, the above might be said to be a truism. Every physician should be aware of the need for a routine tuberculin test on young children. However, the results of a questionnaire<sup>2</sup> mailed out to 2,500 practicing pediatricians in this country belie this statement. Of 1,480 replies, only 821 or 55.5 per cent stated that they used the routine tuberculin test. Of those who did use the test, 20 per cent employed it only after the age of 3 years, too late to be of maximum case-finding benefit.

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How much tuberculosis actually exists in this age group? This undoubtedly varies in different sections of the country. However, an example may be seen in the BCG study in progress at the Medical College of Virginia. This study, conducted in association with the well baby clinic, admits only infants under 6 months of age. A recent compilation of data showed that of 550 control patients, 60 or 11 per cent<sup>3</sup> had become tuberculin positive before 3 years of age, and 75 per cent of those were less than 2 years old. Myers<sup>4</sup> has pointed out that no attempt should be made to minimize the importance of such tuberculous infection, most often exemplified by a positive tuberculin test with no demonstrable pulmonary lesion. The child who has a positive tuberculin test, but who has no other apparent sign of the disease either on physical examination or roentgenogram, must be classed in the same group as those which show roentgenographic evidence of mediastinal tuberculosis, with or without a demonstrable primary parenchymal focus.<sup>5</sup> Obviously, any child under 3 years of age with a positive tuberculin reaction must be considered to have active tuberculous disease. The lesion has scarcely had time to become inactive.6

Since tuberculous disease can be shown to be both common and serious in this age group, a routine tuberculin test is recommended for all infants between the ages of 12 and 18 months and for all new patients more than a few months of age. The patch test is quite satisfactory for routine testing, but the patch should be carefully applied after the site has been cleansed with acetone or ether and detailed written instructions as to the care and removal of the patch should be given to the parents. The patch should not be allowed to become wet before it is removed forty-eight hours after application. Reading takes place at this time, and the site of either or both of the top and bottom squares must show an area of redness and induration at least 0.5 cm. in diameter in order to be adjudged positive. Indeed, we feel that any reaction short of vesicu-

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# Accomplishments and Future Needs to Eradicate Tuberculosis\*

J. ARTHUR MYERS

Minneapolis, Minnesota

When the first meeting of the Mississippi Valley Conference on Tuberculosis was held in Chicago on March 28, 1912, tuberculosis was the most prevalent and serious of all diseases in the states in this conference. It still is.

This conference and the Mississippi Valley Trudeau Society have the finest opportunity in history to inform the people of the world of the methods that have resulted in the most successful victories over tuberculosis of all time and to lay out a program of eradication.

#### ORIGINAL OBJECTIVES — EDUCATION

As tuberculosis associations were organized, a main objective was dissemination of information. These organizations prepared and distributed millions of pamphlets, numerous displays and exhibits, arranged for millions of addresses to be presented before large and small audiences as well as great numbers of radio broadcasts, newspaper and magazine articles, and now television programs. This educational work led to cooperation of our citizenry which resulted in building of sanatoriums and hospitals, organization of dispensaries, laboratories, case-finding programs, and so forth.

#### PREVENTION OF DEATH

A principal objective was to prevent people from dying from tuberculosis. As late as 1923, 26,188 deaths occurred in the states composing this conference with a population of 35,676,967—the mortality rate was 73.4 per 100,000. In 1952, only 5,664 deaths occurred in these states with a population of 45,674,007—the mortality rate was 12.4. If the death rate of 1923 had continued, 33,470 persons would have died in 1952. Saving 27,806 lives is an accomplishment of great magnitude.

Figure 1 shows the number of deaths per age group in 1923 and 1952. In 1923, 1,186 deaths occurred among children from birth to 4 years of age, but in 1952 only 204 deaths occurred. In 1923, 2,426 girls and boys from the age of 10 to 19 years died from tuberculosis, but in 1952 only 84. Between 20 and 40 years,

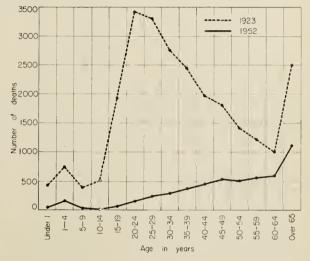


Fig. 1. Shows number of reported deaths from tuberculosis by age groups in the 12 states of the Mississippi Valley Tuberculosis Conference in 1923 and 1952.

12,481 died in 1923, but only 1,079 in 1952. This is an excellent accounting of our stewardship.

#### PREVENTION OF ILLNESS

In these states, 39,345 new cases of tuberculosis were reported in 1923 (a case rate of 110.3 per 100,000) and 27,550 in 1952 (a case rate of 60.3 per 100,000) (figure 2). Even these figures are misleading since they are not entirely comparable for the two years. In 1923, most persons reported as tuberculous sought examinations because of symptoms. During 1952, intensive case-finding programs revealed a large number of cases in the presymptom stage. Obviously, if the same case-finding effort had been in vogue in 1923, numerous presymptom cases would have been found which would have brought the total far beyond 39,345. Likewise, if in 1952 only persons had been reported who had symptoms, the total number would have been far less than 27,550. Since 1947, an actual divergence has occurred between mortality and morbidity be-

<sup>\*</sup>Read before a joint meeting of the Mississippi Valley Trudeau Society and the Mississippi Valley Conference on Tuberculosis, Minneapolis, October 16, 1953.

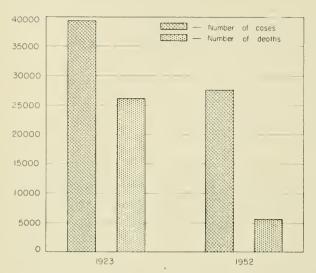


Fig. 2. Shows total number of reported cases of tuberculosis and total number of reported deaths from tuberculosis in the 12 states of the Mississippi Valley Tuberculosis Conference in 1923 and 1952.

cause many lives have been at least prolonged by chemotherapy.

#### PREVENTION OF INFECTION

The belief fifty years ago was that 90 to 95 per cent of children were infected with tubercle bacilli by the age of 15 years. In many places the situation has been reversed. There are large expanses in this conference area where not more than 5 per cent of high school students and 3 per cent of grade school children have been infected. Sizeable regions exist where no infected individual is to be found among grade school children. However, there are still many persons in the fourth decade of life and beyond who harbor tubercle bacilli (figure 3). These people constitute a serious potential future problem.

#### LESS THAN HALF WAY

In this Mississippi Valley area the most spectacular accomplishment of all time anywhere in the world has been made. Despite this, our work is less than half done. Some major reasons are:

- 1. The very nature of the disease makes it so. The tenaciousness of the tubercle bacillus is such that if it enters a human body at any time, even in infancy, its descendants may remain alive and virulent throughout the remainder of life's span, having at all times the capability of producing destructive and contagious disease.
- 2. Since neither a mild nor severe attack of tuberculosis results in dependable immunity, all who have primary infections are in danger of becoming contagious cases. Moreover, many of those who had clinical disease brought under

control reactivated from one to numerous times, thus complicating the problem.

- 3. No way has been devised to prevent people from becoming infected with tubercle bacilli except to protect against contagion.
- 4. Among persons born between 1875 and 1910, almost no protection was afforded against tubercle bacilli of human or bovine type, and probably the majority were infected. It was that generation which, for the most part, provided the high mortality rates, filled our institutions to capacity, and left the long waiting lists for sanatorium beds over the past few decades. The nation's tuberculosis mortality rate still reaches its height among that generation.

#### FACTORS WHICH COULD WIPE OUT OUR GAINS

1. Several hundred thousand displaced persons have been admitted to this country since 1945. The majority of them came from parts of the world where nearly all adults harbor tubercle bacilli. It has been estimated that from 3,000,000 to 5,000,000 illegal aliens have entered since 1945, and that they too are from areas where tuberculosis is rife. In some areas an alarming number already have clinical tuberculosis.

Adamson and Edmison, after finding 10 times more tuberculosis among Polish soldiers sent to Canada to engage in agricultural pursuits after World War II than among Canadian citizens of the same age group, called special attention to the health hazard involved in immigration to Canada and pointed out that if proper precautions are not taken, the result will be the introduction of "an enormous amount of tuberculo-

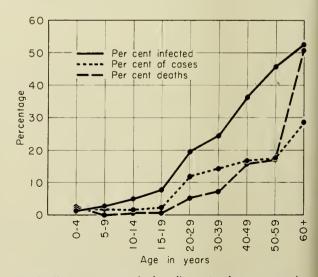


Fig. 3. Shows percentage of tuberculin reactors by age groups in Lincoln and Lyon counties, Minnesota. Also percentage of reported cases and deaths from tuberculosis in entire state of Minnesota in 1952.

sis." In Queensland, Australia, Orchard reported on a survey that made it clear that some scheme of special and continuous observation of immi-

grants from World War II is necessary.

2. For some time approximately 1,000 and now from 600 to 700 of our war veterans have been reported to have developed clinical tuberculosis each month. Unless extreme care has been excreised in Korea and other parts of the world where our service girls and boys have been stationed since World War II and during the Korean war, we may expect a high incidence of infection, making of them potential cases of clinical tuberculosis.

3. Whether present chemotherapy is of permanent value is not yet known. Possibly this form of treatment only extends lives of persons who may again be ill or die from tuberculosis. Moreover, we do not yet know whether resectional pulmonary surgery for minimal lesions will produce better results than collapse therapy. Our present enthusiasm for chemotherapy and resectional surgery may be justified. However, even tentative conclusions cannot be drawn until after a decade or more of experience.

4. Relaxation of effort on the part of some of our tuberculosis associations and others is frightening. Funds, time, and effort have been diverted from tuberculosis to other diseases and conditions. This laxity is partially due to a sense of false security derived from the rapidly decreasing mortality rate. Thus the tubercle bacillus is given an opportunity to strengthen its forces and lengthen its battle line. In any area where such a situation prevails, increased destruction from tuberculosis must be expected.

#### WHAT OF THE FUTURE?

To date we have no shortcut method by which tuberculosis can be eradicated. If the dissemination of tubercle bacilli were stopped today, a significant problem would still exist for more than seventy years. This is true because tubercle bacilli have already taken refuge in the bodies of so many of our citizens. Everyone who harbors these bacilli is a potential case of clinical tuberculosis. Such clinical disease will not develop in all these individuals, but in enough to maintain a serious problem just as long as infected persons are alive.

An infant infected today may remain in good health through a long life, but still may become a clinical and contagious case of tuberculosis in senility from progeny of tubercle bacilli which

invade his tissues today.

Elderly people are not apt to die from tuberculosis because of recent exogenous infections. If so, a high annual infection attack rate would be found among children and young adults. This condition is rarely, if ever, observed. Moreover, if the bodies of elderly persons who died from tuberculosis are searched with sufficient care, lesions of the old primary complexes acquired long ago are found. Such lesions also are found in the bodies of elderly persons who died from other conditions which were potential menaces up to the time of their death and which could have produced clinical disease had the individuals' lives been extended.

The magnitude of our future problem and the patience which must be exercised in solving it may be appreciated when the length of time is considered that the veterinary profession and its allies have taken to reach the tuberculosis eradication goal among cattle. From 1892 to 1917, the accuracy of the tuberculin test in determining the presence of tubercle bacilli was conclusively proved. Large demonstrations were conducted so it was known that the only method by which the disease might be eradicated from animal herds was to test all of the cattle of this country periodically and remove the reactors. With this knowledge at hand the United States Bureau of Animal Industry initiated a nationwide tuberculosis eradication campaign in 1917. Some advantages of the veterinarians' program are: (1) The number of cattle in the United States is only 93,696,000. (2) The life span of cattle is only about 6 to 8 years. (3) Wherever found by the tuberculin test, tubercle bacilli were promptly destroyed by eliminating the animals.

With these advantages, from May 1917 to November 1940 was the time required before all of the 3,072 counties were accredited. Veterinarians of this country have moved nearer the eradication goal among animals than those of any major nation. They have practically solved one of America's largest economic problems and have removed a big bloc of tuberculosis from our citizenry. The incidence of tuberculosis among cattle has been reduced to 0.11 per cent in 1953. In large areas, the disease has been completely eradicated. The goal is total eradication. Therefore, periodic testing of our cattle continues and effort will not relax as long as a single animal reacts to tuberculin.

The problem of eradicating tuberculosis from people is much more difficult. For example: (1) Our population is 160,000,000. (2) The span of human life now closely approaches 70 years. (3) A high percentage of older people harbor tubercle bacilli. (4) Tubercle bacilli found to exist in the bodies of people by the tuberculin

reaction cannot be promptly destroyed. We have the enormous task of examining all tuberculin reactors periodically in order to keep their tubercle bacilli corralled. Nevertheless, the method here proposed and already in use in some areas can achieve eradication. Much more time will be required to wipe out the disease in people than in cattle.

## FACTORS AND TECHNICS TO HASTEN ERADICATION

Some fundamentals stand in bold relief as to efficacy in tuberculosis control. A recent survey of nations revealed that wherever diagnostic and therapeutic procedures, hospital and sanatorium beds, and tuberculosis control among domestic animals have been even in moderate use, a decline in tuberculosis started rather promptly. Moreover, that decline has continued. Good examples are most of the states of the upper Mississippi Valley and Scandinavian countries. In Denmark, Iceland, and Norway there are 7, 13, and 6 beds per annual death, respectively, and a similar bed situation exists in some states of this conference area, each of which has approximately the same population as Denmark and Norway. In countries which have not provided a reasonably adequate number of sanatorium beds or control of the disease in domestic animals, tuberculosis remains at a much higher level.

Those sanatoriums operating at one-half capacity or less could be filled within the next few years because of existing factors which could cause an early return of much clinical tuberculosis. Moreover, all sanatorium staffs should be retained to scour the areas they serve for all persons who harbor tubercle bacilli and to examine them periodically.

#### COST OF TUBERCULOSIS CASES NOT FOUND

Much discussion is heard about the cost of finding a case of tuberculosis. Our chief concern should be what it costs not to find a case.

To abandon an area where the number of cases of clinical tuberculosis is so small that the cost is \$5,000 or more to find one case, and to move into an area where the cost is \$200 or less per case may seem like good economy at the moment. Obviously, to find all of the \$200 cases is good, but to fail to find the \$5,000 case in a high school student, for example, may prove extremely costly over the next seventy-five or more years. Such an individual may infect 100 or more persons in the schools, homes, and community, and a significant percentage will have clinical tuberculosis between the time of infection and senility. The ultimate cost will far sur-

pass the amount it costs to find the case now.

Definitions as to what constitutes a case of tuberculosis have usually applied to persons who are ill or have gross demonstrable lesions. Such definitions have definitely retarded progress. In reality, tuberculosis begins promptly after the initial invasion with tubercle bacilli. Microscopic lesions are formed in which tubercle bacilli reside. However, the disease cannot be detected until the tissues become sensitized to tuberculoprotein, which may be about eight weeks after the invasion. At this time, usually no symptom is present, no roentgen-ray shadow-casting lesion, or other manifestation of tuberculosis except the reaction to tuberculin.

Nevertheless, such persons have tuberculosis just as truly as those seriously ill from meningitis, miliary, or far advanced chronic pulmonary disease. The only difference is one of degree. Why we should define the case of syphilis in one way and tuberculosis in another is not clear. With a primary syphilitic lesion in evidence and positive serology, we recognize a case of syphilis. In tuberculosis, however, with primary lesions and tuberculin reactions, we are too often unwilling to identify the host as a case of tuberculosis. We call it "tuberculous infection without disease," and wait until gross incapacitating and contagious lesions are in evidence before the individual is designated a case.

If 1,000 adults of any age are examined adequately, all must have the tuberculin test. If 300 react, 2 of whom by roentgen-ray inspection, bacteriologic studies, and so forth, are found to have gross tuberculous lesions, we charge the entire cost of the 1,000 examinations to these 2 cases. In reality we have found 300 persons who have tuberculosis, and, therefore, the cost should be divided by this number to obtain the cost of each case found. Also, significant information has been obtained in determining that the remaining 700 do not have tuberculosis.

Schools. A decade or more ago many of our tuberculosis organizations abandoned excellent programs which they had been operating in schools. This was done because case-finding methods in schools resulted in "too small yield" to justify the effort and expense. To those interested in finding only gross tuberculosis as manifested by roentgen-ray shadows, this was true, but to those interested in striking at the very heart of tuberculosis, it was a different matter. To abandon tuberculosis work in schools was failure to follow the advice of Trudeau in 1905, when he said, "Education should begin by teaching in the public schools the main facts relating to the transmission of tuberculosis, insist-

ing in such teaching on the value of hygienic measures of prevention." The best kind of education comes through actual participation for all, children and personnel alike. Opportunities are unlimited among our 45,000,000 children, of whom about 35,000,000 are of school age. The 1,000,000 teachers and the large number of other personnel members of our schools could promptly be converted into a mighty army against tuberculosis if they learned about the disease by participating in school programs.

Practically every child who reacts to tuberculin has been in contact with an adult who has contagious disease. The adult can frequently be found if sufficient effort is exerted. Every child who reacts to tuberculin is a potential case of the type of tuberculosis that causes illness and death in adulthood. Therefore, all such children should be found and informed of this po-

tentiality.

In areas where good tuberculosis programs in schools have been in continuous operation for twenty or more years, a fine understanding is present among the citizenry of the problem and its solution. These areas now have the lowest mortality, morbidity, and infection attack rates in the nation.

General practitioners of medicine. We now have an opportunity to atone for the injustice and neglect which the general practitioners of medicine have been allowed to suffer in the tuberculosis control program. We have failed to take cognizance of Dr. Trudeau's statement, "On the general practitioner and the dispensary physician rests a great responsibility of detecting the disease in its incipiency. It is to them and not to the specialist that the patient first applies."

In a few areas, general practitioners have been allowed to retain their rightful position. A sanatorium district may be cited that now serves 250,000 people where, for more than a third of a century, the medical director recognized the importance of general practitioners and acted accordingly. Upon arrival at the sanatorium, patients heard their own physicians praised. During the patients' stay in the institution, the medical director kept in close touch with the family doctors by correspondence or telephone conversations. He invited them to visit their patients while in the institution.

When patients were ready for discharge, they returned to their general practitioners and were advised to keep under close observation with frequent periodic examinations. In advance of discharge, the medical director informed the physicians that their patients were returning home and that full responsibility for postsana-

torium care would rest upon them. Thus, the patients returned with every confidence in the ability of the physicians who had diagnosed their cases. Therefore, in this sizeable geographic area, the office of every physician was and is a tuberculosis center where the latest information on diagnosis, treatment, and prevention are known and practiced. In the countics of this sanatorium district, the lowest mortality, morbidity, and infection attack rates existed in the state in 1952. Several other sanatorium districts in this conference area with similar programs and results could be cited.

There are 25,786 general practitioners in the states composing this conference. Almost overnight these physicians could become an immense force against the tubercle bacillus. Obviously the few chest specialists in the upper Mississippi Valley cannot solve the medical aspects of the problem alone. Help of all other physicians and especially general practitioners is needed.

Not enough emphasis has been placed upon tuberculosis work done in the offices of physicians and hospitals where more tuberculin testing, x-ray film inspections, and final diagnoses have been made than in surveys. Surveys have been of great value as demonstrations, but the best case finding of the future will continue to be practiced in the offices of physicians, hospitals, and permanent clinics.

#### CHANGING EMPHASIS

As the use of our diagnostic armamentarium has improved and the tuberculosis situation has changed, emphasis in procedures has shifted. Early in this century, our diagnostic procedures resulted in detecting tuberculosis, for the most part, after an advanced stage had been reached.

With the adoption of the more general use of the x-ray film, shadow casting lesions which proved to be tuberculous were often seen in the absence of symptoms, but a considerable portion of these lesions were in an advanced stage. This led to the mass roentgenogram survey which was first employed in this area in the early 1920's and which gained in popularity to its present extensive use. X-ray film inspection of the chest, whether limited to an individual or to masses of people, has been of great value in many places in quickly screening out persons who have gross lesions, tuberculous, and others. No one has been well examined for chest diseases unless x-ray inspection has been made of the chest.

Wherever nearly all adults are infected with tubercle bacilli, mass roentgen-ray surveys will continue to be helpful as long as this situation obtains. However, these films will never bring to light lesions that have not reached gross proportions or such consistency as to cast shadows. Thus, all persons who have tuberculosis but do not have such lesions are missed by roentgen-

ray inspection.

Emphasis is now shifting from the finding of only gross lesions to the discovery of all persons who have tubercle bacilli in their bodies. We have waited until individuals reported with symptoms or until lesions were so large that they could be detected by the roentgen-ray shadow they cast before we became concerned. Although this kind of work should be continued a while longer, our emphasis must be changed to finding the culprit — the tubercle bacillus and before gross lesions have caused destruction.

#### TUBERCULOSIS STILL PREVALENT

A great deal is currently said about an estimated 400,000 or 500,000 cases of tuberculosis in the United States. Even if this is an accurate figure, it applies only to those who have active or inactive disease, demonstrable by the roentgenray shadows. This figure is less than 1 per cent of the persons who now have tuberculosis but still have clear chest x-ray films, many of whom are destined to develop gross lesions in subsequent years and decades.

The only true criterion of the prevalence of tuberculosis and the magnitude of the present and future problem is the number of persons who have and those who subsequently take

tubercle bacilli into their bodies.

When tubercle bacilli first invade the human body, they and the white blood cells which ingest them are microscopic. This is also true of the initial lesions produced. In fact, for several weeks after the invasion occurs, no phase of examination is of any avail. However, within approximately eight weeks the individual's tissues, including the skin, have become so sensitized to tuberculoprotein as to react characteristically when some of this substance is applied to the surface or introduced into the layers of the skin. Thus, the reaction to original tuberculin or purified protein derivative is the first evidence the physician can obtain of the presence of tubercle bacilli in the individual's body. At this time, the reaction to tuberculin is so specific and characteristic that it is our only detector.

Thus, a shifting has already begun from mass roentgen-ray surveys to mass tuberculin test surveys in order to corral all the tubercle bacilli in a given area. Reactors are promptly examined to determine whether gross lesions detectable by x-ray film inspection and other phases of the examination are in evidence. In the absence of

such lesions, the reactors have examinations including x-ray film inspection of their chests at least annually in order that lesions destined to evolve to gross proportions may be found in the presymptom and precontagious stages when they yield best to treatment. By examining tuberculin reactors periodically, chronic evolving lesions usually can be found on an average of two or more years before they cause symptoms or become contagious. Prompt treatment keeps the tubercle bacilli corralled. The examination is not limited to the chest since 10 to 15 per cent of clinical lesions are located extrathoracically.

#### PRACTICAL AND EFFECTIVE PROJECTS

Technics have been devised and adequately demonstrated which are capable of greatly accelerating our tuberculosis eradication program. A project which was formulated by the Committee on Tuberculosis of the American School Health Association consists of helping to establish or reestablish good tuberculosis control programs in schools.

Certification of schools. An arrangement was made whereby the American School Health Association in cooperation with state subcommittees would offer certificates to individual schools or whole school systems which met certain qualifications with reference to tuberculosis control

work in progress.

Minnesota was chosen for the demonstration, partially because its Tuberculosis and Health Association had emphasized the importance of tuberculosis control programs in schools continuously for more than twenty years. This choice made a strong appeal to educators, parent-teacher associations, and entire communities. The first group of schools was certified in 1945. Now more than 1,700 schools have these certificates officially signed and displayed on their walls. Local pride and a desire to eradicate tuberculosis from the schools of the state has resulted almost in clamor of other schools to meet the qualifications.

This program requires participation of 100 per cent of personnel and is rapidly spelling the doom of the tuberculous teacher, bus driver, and so forth, in whom unsuspected contagious tuberculosis has developed, and prevents them from transmitting it to other personnel members and children. Grade school children are being found who are infected with tubercle bacilli and often the source of infection in their communities.

Accreditation of counties. This plan was first considered in the early 1930's. The idea was borrowed from the veterinary profession which found accreditation of counties and states, with reference to tuberculosis eradication among cattle, one of the most effective measures in promot-

ing their programs.

Standards were established in Minnesota by which counties could be accredited. The first qualification was that a county must have an average mortality rate over the immediately preceding five years of 10 or less per 100,000 population. The second was that at least 90 per cent of the seniors in the high schools throughout the county be tested with tuberculin, and, if not more than 10 per cent reacted, the county was acceptable. The first county was accredited on December 11, 1941.

To date, 27 counties have been accredited, and 37 others have recently qualified from the standpoint of mortality rates. It only remains to test 90 per cent of the seniors in the high schools of these 37 counties before they can be accredited. Thus, 64 of the 87 counties will soon be accredited and probably most of the remaining 23 will deserve this classification within the next five

This method has proved excellent by insuring participation of all physicians as well as the entire citizenry in the eradication movement.

#### MOST DIFFICULT WORK LIES AHEAD

Dangerous practices. If we do not stop broadcasting that there are 500,000 cases (130,000 in the upper Mississippi Valley) of tuberculosis, which is only 0.313 per cent of our population, when there are probably 50,000,000 (13,500,000 in the upper Mississippi Valley) with all the makings of clinical tuberculosis in their bodies who should be found and managed, we must expect the sense of false security already so prominent in the public mind to become more so. At least one fund-raising campaign has far surpassed ours, even though it was established more recently, and the disease for which the fund is raised is far less destructive than tuberculosis.

Overenthusiasm, frequently bordering on fanaticism for methods based on theory, personal opinion without proof of efficacy, have often greatly retarded tuberculosis work by giving the public and even some workers the impression that methods are now available which soon will result in eradication.

Premature predictions have cost us much public confidence. Promptly after discovery of the tubercle bacillus, a prediction was made that the end of tuberculosis was in sight.

When the campaign to procure sanatoriums was in progress in the first and second decades of this century, the prediction was made that if adequate sanatoriums were provided, the tuberculosis problem would be solved in twenty years.

Within the past decade a prominent physiologist was quoted as saying that BCG would soon render sanatoriums obsolete. In 1949, with refcrence to the tuberculosis problem in Japan, it was said that an immunization program will in the future prevent the occurrence of most of the cases of clinical tuberculosis.

In 1953, the statement was made that tuberculosis can be eliminated as a major social hazard within the next ten or fifteen years by the use of chemotherapy and resectional surgery. Closing of some sanatoriums was recommended. Within the past few months a prominent American internist is said to have stated that probably within five years the tuberculosis mortality rate in the United States will be approximately 5 per 100,000, after which the disease will cease to be of much importance as a national problem.

If these later predictions should become widely publicized, the sense of false security already rampant will zoom to the sky. Therefore, all tuberculosis organizations and all individuals who are seeking eradication of the tubercle bacilli must unrelentingly combat such premature predication with facts. In so doing, sound prediction by some of our best students of tuberculosis are helpful. For example, in 1926 Allen K. Krause, Baltimore, who had a thorough understanding of this disease predicted that the mortality rate might be as low as 20 per 100,000 in 1940.

Henry D. Chadwick, Boston, in 1940 said: "The ultimate surrender of the tubercle bacillus, however, is two generations away unless new developments in treatment come to our aid. This surrender may be brought about more quickly by discoveries made in the fields of chemotherapy and nutrition." In 1952, H. R. Edwards, New York, said it will require generations to find the last infected person.

Must present facts. Nothing inspires and perpetuates confidence and support like truth. Therefore, our citizenry should be given all the facts. They constitute the best fighters in the world for worthy causes. They must be told that freedom from the ravages caused by the tubercle bacillus will be achieved only when all persons with this germ are found and thereafter watched periodically, in order that clinical lesions which may evolve will be detected before they become contagious and when most of them can be treated successfully. We lament that there is no test to detect the presence of cancer while its lesions are still microscopic. We have such a test for tuberculosis and it must be administered among persons of all ages if our cradication goal is ever attained.

The most important question concerning tuberculosis is not how many persons die or how many are found to have gross lesions each year, but how many now harbor tubercle bacilli?

#### COST OF ERADICATING TUBERCULOSIS

Tuberculosis is often said to be costing this country \$600,000,000 annually. This is far too low. If all costs were considered, including loss of time of patients, deaths, and so forth, the actual amount would be five times this estimate. In the 12 states here presented, slightly more than 22,000 hospital and sanatorium beds were operating in 1952 at a cost for that year of about \$78,500,000. These states received their share of the \$8,240,000 appropriated to the Division of Tuberculosis and Chronic Diseases of the United States Public Health Service for tuberculosis control. The total gross Christmas Seal sale in 1952 amounted to only \$7,235,930.70. The total is a mere pittance compared to what we need to eradicate tuberculosis. When this country wanted an atomic bomb, \$2,000,000,000 were appropriated to develop it and untold billions have been spent to produce it. Now when we consider the eradication of man's greatest enemy from prehistoric days to the present, we must arrange for sums of money commensurate with the magnitude of the work involved.

In the long run this method will be far less costly than the one employed in the past. A good example is the eradication program among cattle. It cost the owners of these animals \$300,000,000 every ten years prior to the initiation of the national eradication program. It cost only \$260,000,000 to accredit all of the states. The present cost of the program, which is rapidly approaching cradication of this disease, is a mere fraction of what it was in the beginning.

#### ERADICATION MUST BE OUR GOAL

When in an entire year no one dies and few, if any, fall ill from tuberculosis in one or a group of counties, proof that a large and seri-

ous problem still exists is to test the entire population with tuberculin. In 2 such counties, recent tuberculin testing surveys revealed the incidence of reactors to be approximately 21 per cent. The percentage was exceedingly low among children and young adults but reached its height among the older persons who were not protected against infection with either the bovine or human type during infancy and child-hood. These individuals still carry residual tubercle bacilli containing lesions. To keep these persons under close surveillance with periodic examinations is a considerable task. However, this is the only known method of eradicating this disease.

When an organization abandons tuberculosis work in such areas, it has failed to recognize the magnitude of the remaining problem. If tuberculin reactors are not found and kept under observation, enough of them will later develop contagious disease to contaminate the greater part of the population. When a tuberculosis organization announces that it plans to extend its activities to other diseases, because so few are dying or falling ill, it only enhances the sense of false security of the public.

What a pity if our tuberculosis groups were to convert their activities when the work for which they were organized and for which they have been so widely recognized and supported is less than half finished. Never in history has such organization and machinery been brought to operate against any disease. To stop now or to decrease rather than intensify our efforts could cause loss of all past accomplishments.

The eradication program does not include any new or startling procedure or any revolutionary idea; rather it consists of an intelligent understanding of the facts at hand and the employment of these facts as a tried and true foundation for future actions.

Hoyt E. Dearholt, one of the two founders of the Mississippi Valley Conference, clearly had eradication of tuberculosis in mind when he coined that often quoted phrase, "No home is safe until all homes are safe."

Sincere thanks are due State Boards of Health and secretaries of Tuberculosis and Health Associations throughout the 12 states composing this conference for supplying much of the data contained in this paper.

## Lancet Editorial

## The Tuberculin Test Has Meaning

Tor Many Years American physicians have provided the leadership in our tuberculosis control program.

For too long American physicians have failed as leaders to inform our communities about tuberculosis eradication and to educate our citizens concerning necessary actions to be taken.

For too long we allowed our patients to believe that a positive tuberculin reaction merely means contact with tuberculosis germs. It is our responsibility to tell patients that a positive tuberculin reaction means tuberculosis infection.

For too long we allowed our patients to believe that knowledge about their tuberculin reaction status need not be determined as "most of us are positive anyway" and "it doesn't tell the physician much." It is our responsibility to tell our patients that only persons infected by tubercle bacilli have positive tuberculin reactions; that people with negative tuberculin reactions do not have tuberculosis; that each person should know his tuberculin status; and that negative reactors of today may become positive reactors tomorrow and, hence, should have their status determined at periodic intervals.

For too long we allowed our patients to believe that the earliest evidence of tuberculosis infection in human beings can be detected by x-ray films. It is our responsibility to tell our patients that the earliest objective evidence is development of a positive tuberculin reaction.

For too long we allowed our patients who are positive tuberculin reactors to forget that fact and its meaning. It is our responsibility to educate our positive reacting patients to the need for regular, periodic medical assessment. For these reactors, annual health counsel is not only a good habit — it is an essential health habit.

For too long we have permitted community efforts to be dissipated in the supervision of, or provision of services for, individuals whose likelihood of developing tuberculosis was slight.

Is it now our responsibility as physicians to inform our community that an annual x-ray film intended to reveal tuberculosis is a waste of money for the 75 per cent or more, of people who are negative tuberculin reactors?

Is it now our responsibility as physicians to

pool our information so that we may know the time lag between conversion of tuberculin status to positive and the development of clinically apparent illness?

For too long we have allowed communities to assume that a health department is adequate which considers the household as the only area for epidemiologic concern in tuberculosis control. It is the physician's responsibility to inform the community of the need for a health department which can extend its investigation and health education to the patient's fellow workers and to his social contacts.

For too long we have given lip service to the idea that tuberculosis is an illness and not a social stigma. It is our responsibility to positively affirm the fact that tuberculosis is an illness caused by a germ which is transmitted from man to man. It is our responsibility to educate our patients to present themselves for a tuberculin test seven weeks after exposure to an individual who is diagnosed as having clinical tuberculosis. It is our responsibility to educate patients who are positive tuberculin reactors to report to us immediately after sustaining an exposure.

Lastly, physicians have a responsibility concerning their own education. Our present day physician has enough information about tuberculosis both as a disease and as an aspect of our community sociology to warrant his developing the following habits: (1) determining the tuberculin status of each of his patients, (2) informing his positive reacting patients about the meaning of such reaction and educating such patients to seek routine periodic examinations for tuberculosis activity, (3) informing his negative reacting patients about the meaning of such reaction and retesting, (4) routinely tuberculin testing any patient whose differential diagnosis includes tuberculosis, (5) insisting that examinations prior to group participation, include determination of the applicant's tuberculin status, (6) using the services of the health department to perform routine epidemiologic investigation starting from each tuberculin conversion occurring in his practice.

If no person in this country were to convert to a positive tuberculin status after today, tuberculosis would be eradicated with the death of the last positive reactor. This could theoretically occur around the year 2025. The longer the delay in intensive concern about the positive tuberculin reactor, the longer it will take to attain eradication.

Even if a medicament became available which

would preclude positive reactors from developing clinically active disease, our responsibility for popularizing tuberculin testing should not abate, as our function would still be to identify all those who should receive such medicament.

H. S. MILLER, M.D.

Winnetka, Illinois

Medical Treatment of Disease, edited by Henry A. Christian, M.D., 1953. New York: Oxford University Press, 965 pages. \$25. This loose leaf volume deals with treatment of diseases which are usually the concern of the internist or the general practitioner. The book was edited by the late Dr. Henry A. Christian and was completed but a short time before the death of this great man of medicine.

Diagnostic and etiologic data are purposely omitted. And treatments by surgical and other specialists are only mentioned in passing in the well written text. Each chapter is followed with bibliographic references culled from articles published in the last two or three years. Thus the reader is afforded the opportunity to delve more fully into information which interests him in particular. The volume will be valuable to students and practitioners alike. The book is replete with clear cut suggestions and specific instructions in management of disease. Treatment principles are rational and practical applications are so clearly stated that they will be quickly grasped.

The authors avoided multiplicity of therapeutic measures and left out many newer treatments except where these have been fully accepted as a result of considerable elinical experience. Drug recommendations show evidence of careful selection. This reader was pleased to note that trade names — so common in this day of highly competitive drug merchandising — are often paired with official terms.

The print is clear and large enough for easy, rapid reading. The index is excellent and it is handsomely supplemented by a listing of the chapter headings on the first 8 pages of the book. The flexible loose leaf binder lends itself to easy revision of the text.

The volume is recommended as a



source of quiekly available guidance in the treatment of disease.

R. F. Erickson, M.D.

Clinical Disorders of the Heart Beat, by Samuel Bellet, M.D., 1953. Philadelphia: Lea and Febiger. \$8.50

This text is an excellent review for any interested physician, particularly the internist and cardiologist. It is detailed enough to bring out pertinent data from a wide elinical experience. The subject is presented in sections: (1) The general arrhythmias; (2) Discussion of individual arrhythmias; (3) The common clinical status in which the arrhythmias play a prominent role; and (4) Pertinent features relating to commonly used drugs.

The chapters on digitalis, quinidine, and Pronestyl summarize briefly the present state of knowledge concerning therapeutic application of these drugs. This volume covers theory and application in a way that makes it a valuable addition to the internist's reference library.

C. A. McKinlay, M.D.

Acute Renal Failure, Including the Use of the Artificial Kidney. By J. T. MacLeon, M.D. 1952, Springfield, Illinois: Charles C Thomas. 114 pages. \$6.50.

The scope of this book is somewhat wider than one would suspect from its size. The author discusses the factors producing renal failure as well as acid base, electrolyte and water balance, the renal circulation from the point of view of collaterals; "lower nephron nephrosis" is considered in some detail as the causes, micros-opic appearances, and results. One chapter on diagnosis is brief but practical and emphasizes the role of cystoscopy and ureteral catheterization in recognizing the occasional obstructive anuria.

The treatment of anuria is considered at some length. The author concludes (rightly, in the opinion of the reviewer) that such measures as spinal anesthesia, the use of induced fever to improve renal circulation, and renal decapsulation to relieve "edema" of the kidney are of doubtful value.

Methods, other than the artificial kidney, of removing nitrogenous wastes are discussed rather briefly but clearly; included are peritoneal lavage, gastric and intestinal lavage, and the irrigation of an isolated loop of ileum. Vest and his associates would disagree with MacLean's statement that "the only effective method of removing potassium from the body in anuria is by dialysis in the artificial kidney." They have reported success both with intestinal and with peritoneal lavage in hyperpotassemia.

The various types of artificial kidney are described, and the author's experience with the Kolff kidney is discussed in some detail. Since this comprised but five cases, it is not comprehensive. He concludes that it is of value in the oligurias and anurias due to reversible renal lesions, and in hyperkalemia.

It has not yet been demonstrated, however, that the artificial kidney will save more than a very occasional patient who cannot be salvaged by simpler methods. But, the book contains enough data concerning these other methods to make it required reading for those who deal with oliguria and anuria.

C. D. CREEVY, M.D.

## Treatment of Pain Due to Metastasis or Inoperable Malignant Processes

HENDRIK J. SVIEN, M.D., and PETER H. JONES, M.R.C.S. Rochester, Minnesota

Before neurosurgical procedures are undertaken to relieve the pain of a patient who is thought to have metastasis or an inoperable malignant lesion, some facts must be established.

First, in the case of suspected metastasis, previous presence of a malignant process should be definitely established. We recently examined a patient who had a lesion of the breast removed several years before we saw her. She said she now had pain in her neck and arm. She had been told that the lesion was malignant. Review of the microscopic sections revealed the lesion to be sclerosing adenosis, a noncancerous lesion. Critical study of her pain and the neurologic findings strongly suggested a protruded intervertebral disk in the cervical region as the cause of her pain. Pantopaque myelography confirmed the diagnosis, and removal of the protruded disk subsequently relieved the pain.

In another instance, the patient was told, after removal of a breast, that the lesion was cancer. At the time we examined her she complained of severe pain in the lower part of the back and both legs. The microscopic sections showed that the breast lesion was not a papillary carcinoma, but a benign papilloma. The cause of the pain in the back and legs was a protruded intervertebral disk in the lumbar segment. After re-

A second factor to be investigated in the patient who has intractable pain, and is known to have had a previous, proved malignant lesion, is whether or not the pain is due to metastasis or a recurrence of the primary malignant process.

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moval of the disk, relief of pain was obtained.

We recently saw a patient who had a breast removed five years before. Study of the tissue revealed that the lesion was malignant. Some thirty-six months before her examination she began to have radicular pain in the upper thoracic region. At first the pain was present only when coughing and sneezing, but gradually it became worse, particularly at night. Roentgenologic examination of the thoracic section of the spinal column disclosed some erosion of the pedicles and widening of the intraspinal canal at the level of the fourth thoracic vertebra. Neurologic examination demonstrated some hyperactivity of the deep tendon reflexes in the legs and an equivocal Babinski sign on one side. Pantopaque myelography suggested the presence of an intradural tumor. At operation a meningioma, a benign tumor, arising from the dura was removed. The patient's pain was relieved, and no signs of metastasis from the previous lesion of the breast have been exhibited up to the time of this report.

The third factor which must be ascertained before neurosurgical measures for relief of pain are employed for suspected metastasis from, or recurrence of, a malignant lesion, is whether or not the patient can be made comfortable by means other than surgical treatment. The pain caused by infiltration of myeloma, Hodgkin's disease, and some other sarcomatous lesions often can be relieved by deep roentgen or radium irradiation. In many instances, a patient can be maintained in this way in relative comfort until the disease becomes terminal. In other instances, in which the expected longevity is only several months, the problem of pain can be managed satisfactorily with opiates. In an occasional case, Protamide proves helpful in alleviating pain.

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#### Section on PAIN

Usually, injection of local nerves with alcohol or section of these nerves provides only temporary relief, and is of limited value in these cases. In selected cases, however, these procedures when used in conjunction with opiates may be helpful. Instillation of alcohol into the subarachnoid space in such a way that the sensory nerve roots are selectively affected is also of limited value, but occasionally may be useful.

We have stressed importance of investigating the foregoing factors before neurosurgical procedures are employed because these procedures are, for the most part, destructive operations. Occasionally undesirable side effects follow their use. However, to a patient who has a proved malignant lesion and who is suffering considerable pain due to metastasis or local infiltration, whose life expectancy is more than four or five months, these neurosurgical procedures can bring much appreciated relief. Sympathectomy, tractotomy, and prefrontal lobotomy are three operations which have proved to be of value in cases of intractable pain.

Sympathectomy, when applied to the treatment of pain, is limited to instances in which the pain is of visceral origin. After the process responsible for the pain has infiltrated through visceral confines into the adjacent somatic areas, sympathectomy no longer adequately controls the pain. Pain in some cases of carcinoma of the pancreas can be controlled satisfactorily by adequate sympathectomy and resection of the splanchnic nerve.

Spinothalamic tractotomy is done through a laminectomy. The fibers conducting pain pass through the posterior root ganglia on into the spinal cord. These fibers then cross over to the opposite half of the cord. The crossing over, however, does not take place at the level of entrance into the spinal cord, but may be complete only at a level of 4 or 5 segments above the level of entrance. Therefore, the incision into the spinothalamic tract must be made at a level somewhat higher than the level to which the pain extends. For pain in the extremities or trunk as high as the level of the umbilicus, the incision is usually made into the spinothalamic tract at the level of the first or second thoracic vertebra.

Figure 1 shows that no important tracts are sacrificed in a carefully placed incision into the spinothalamic tract. The pyramidal lateral corticospinal tract, which conducts descending motor fibers, lies posterior to the dentate ligament and is spared in selective cutting of the pain

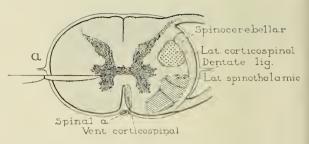


Fig. 1. Position of lateral spinothalamic tract in the spinal cord,

fibers. However, the local blood supply can be compromised and, in an occasional case, some effect on motor power in the lower extremities results. The autonomic fibers governing sphineteric control of the bladder and bowel lie fairly close to the spinothalamic tract, and can be damaged with a deeply placed incision, or may be affected in those instances in which the local blood supply has been deranged. In a unilateral procedure, only temporary dysfunction of the bladder and bowel results, but if the complications we have mentioned occur after performance of a bilateral procedure, loss of sphineteric control may be permanent.

To relieve pain in the upper part of the thorax or arm, the incision into the spinothalamic tract must be placed higher; that is, at the first cervical level or in the medulla or even higher in the brain stem in the mesencephalon. These procedures are attended with somewhat more risk than the procedure done at the upper thoracic level, but in cases in which intractable pain cannot be otherwise relieved, the additional risk is warranted. Incisions into the spinothalamic tracts in the brain stem are complicated by some undesirable side effects such as ataxia and dysesthesias, and, therefore, are used in only occasional cases.

For relief of pain in the face and neck, such as results from carcinoma of the jaw, combinations of intracranial section of the fifth and ninth nerves, incision into the descending trigeminal tract, and intraspinal section of the posterior roots of the upper cervical nerves are carried out with success. All these various nerves and tracts can be sectioned at one time through the conventional posterior fossa craniectomy.

Prefrontal lobotomy is selected in some cases of intractable pain caused by inoperable carcinoma or proved metastasis. Lack of sensation does not occur after lobotomy and no analgesia in the usual sense, but the psychic reaction to the painful stimulus is absent. The emotion of

suffering is abolished rather than the sensation of pain. The incisions into the frontal lobes sever some of the frontothalamic pathways which pass from the frontal lobe into the nucleus dorsalis medialis of the thalamus. This operation results also in a lessening of anxiety and introspection. Thus, it is evident that prefrontal lobotomy offers considerable relief to the patient who not only has insufferable pain but also anxiety and distress because of the knowledge that he has incurable cancer.

In some cases, the undesirable side effects of lobotomy are profound. Extreme euphoria, confusion, impaired judgment, and incontinence of bowel and bladder may result, particularly in the early postoperative period. These undesirable side effects generally subside in time, but occasionally institutionalization may be required. For this reason, the responsible relatives of the patient must be thoroughly familiar with the problem and the possible undesirable consequences of the operation. Since a few patients may have to be institutionalized after prefrontal lobotomy, the procedure might be considered a failure. Nonetheless, most relatives of such patients are very grateful. The patient may act strangely, say, and do foolish things, but he no longer carries the facies of suffering and anxiety. If the relatives feel that the patient is not suffering, they generally accept the other side of the picture.

In an attempt to obviate the undesirable side

effects of prefrontal lobotomy, some have carried out unilateral prefrontal lobotomy, with a degree of success. In this operation the frontothalamic tracts on either side are severed. The resulting personality changes are minimal. Relicf of pain may not be as enduring, however, and in some cases lobotomy on the unoperated side is subsequently necessary.

Transorbital lobotomy has been employed recently for painful conditions as previously outlined. In this procedure the frontothalamic tracts are severed by thrusting an instrument through the roof of the orbit and pushing it on up through the orbital surface of the brain.

Other recent procedures involve the creation of lesions in the frontothalamic tracts or the thalamic nuclei by passing a coagulating current through the tip of an instrument which has been properly placed with the aid of the Horsley-Clarke instrument. This instrument is a fairly complicated headpiece, so arranged that measurements from fixed points over the cranium, or within the brain (such as the calcified pineal gland or the position of the air-filled ventricle), can be maintained. The modified cannula can then be passed into the desired part of the brain with a good degree of accuracy. The results of treating pain by this means are still in the experimental phase. More patients, with adequate follow-up periods, must be studied before the place of this operation in the treatment of pain can be evaluated.

#### BANTHINE FOR DUODENAL ULCER

The beneficial effect of Banthine in controlling duodenal ulcer symptoms may be ascribed at least partly to depression of motor activity through postganglionic blockage of the parasympathetic nervous system. Banthine reduces the number of rapid pressure changes characteristic of duodenal ulcer motility in a manner similar to vagotomy.

Rapid pressure changes in the gastric antrum were correlated with subjective evidence of pain in 4 of 12 patients tested. Each of these 4 patients was suffering from intermittent pain, and received rapid relief from ulcer symptoms and associated antral contractions upon

oral administration of 100 mg. of Banthine. The remaining 8 patients were suffering continuous pain or had quiescent ulcers. In this group, Banthine effected a return toward normal antral motility without significantly influencing pain.

In clinical experience some patients do not respond to Banthine until after twelve to twenty-four hours of medication, whereas, in the 4 patients mentioned, relief was almost immediate. Therefore, pain relief in the slow-reacting ulcer patients must be related to factors other than gastric motility, such as suppression of acid secretion or resolution of inflammation about the ulcer.

NICHOLAS C. HIGHTOWER, M.D., and EARL E. GAMBILL, M.D.: Effects of Banthine on pain and antral gastric motility in patients with duodenal ulcer. Gastroenterology 23:244-269, 1953.

## General Considerations on the Question of Pain\*

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PROBABLY the best definition we have of pain is that proposed by Wolff,<sup>1</sup> "The pain experience is first a sensation derived from noxious impulses traversing specific pathways. Such phenomena may be followed by the familiar and predictable feeling states and other reactions."

Leriche<sup>2</sup> believed that too many physicians feel pain is a defense mechanism, a warning of the presence of disease. This is not true, for with the presence of pain, the practitioner can assume that he is making a tardy diagnosis. Pain should not exist; diagnosis and cure should be performed before this phenomenon takes place.

Pain is not a protective mechanism per se for it does not always accompany protective reflexes nor are protective reflexes necessarily the precursors of painful sensation. Reaction to pain varies with each race and individual and with emotional factors. Pain itself may become the chief complaint, supplanting the initiating factor. It may cause marked personality changes which vary from mild irritability to severe psychotic disorders. It may affect any system of the body, producing such reactions as increase in blood pressure and pulse, nausea, vomiting, and involuntary bowel movements. Therefore, if for no other reason, pain should be specifically treated because of these serious generalized effects.

#### PAIN CONDUCTION

The conduction of pain centrally involves a minimum of three neurons: (1) receptor of primary, (2) connector, and (3) central. Free nerve endings in the skin and elsewhere go to the cell station of the receptor neuron which is in the posterior root ganglion. From there its central process extends through the lateral divi-

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sion of the dorsal root. Short ascending and descending fibers do not extend more than one or two cord segments and terminate in the gray matter of the apex of the dorsal horn where they form a synapse with the connector neurons. These secondary neurons immediately cross the cord in the ventral white commissure and go centrally in the spinothalamic tract. The central neuron cell stations are in the thalamus and in the postcentral gyrus of the cerebral cortex. The thalamus is the primary receiving station for all types of sensation and awareness and is the seat of primitive emotion. In the postcentral gyrus, and other gyri, to a minor degree, is found spatial representation, making it possible to feel pain in the fifth finger as such rather than in the ulnar nerve. The physical sensation of pain is modified by an interplay between the thalamus and the cerebral cortex.<sup>3,4</sup>

The autonomic nervous system is also involved in the conduction of painful sensation. Clinically, Leriche<sup>2</sup> believed that sensory fibers supplying the peripheral parts of the body pass through the sympathetic ganglia to the cord. Gerard<sup>5</sup> believed that the autonomic nervous system can be involved in pain, both on the efferent and afferent side, through the unmyelinated C fibers. The problem of peripheral pain via the autonomic nervous system is yet to be solved. It has been shown that peripheral pain fibers pass directly to the cord,<sup>3,6</sup> yet section of the sympathetics relieves pain. The mechanism of pain relief in this instance may be vasodilatation. Sensory neurons conducting pain impulses from the internal organs (visceral pain) do traverse the sympathetic chain to reach the spinal cord.

Pain conduction involves two differing viewpoints. Is pain a specific or a nonspecific sensa-

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tion? Histologically, Wolff and Hardy<sup>7</sup> have found a physiologic unit with a single cell in the dorsal root ganglion connected to naked nerve endings in the skin. Further evidence to support the specific sensation theory is that surgical transection of the spinothalamic pathways can produce loss of pain in circumscribed regions without loss of temperature or touch.

The experiments of several workers have shown that by stimulation of discrete spots in the skin, each of the four major sensations can be elicited separately, and have concluded that each of these sensations has its own anatomic structure and receptors. This is further supported by the finding that the size of the nerve fibers varies according to the sensation they subserve — pain fibers, small; touch fibers, large.<sup>3</sup>

On the other hand, the theory of the nonspccificity of pain conduction states that the impulses which underlie any sensation represent a composite of impulses arising from more than one end organ. These impulses register centrally as a pattern of excitation and from it the sensations described as touch, pain, and temperature are extracted. This is Head's concept of the central integration of sensory impulses.8 Leriche<sup>2</sup> believed that areas for pain reception can receive other sensations under certain circumstances. He believed that increasing amounts of stimulus produce first touch, then pain; therefore, the same pathways are used for all sensations. In support of the nonspecific theory, it may be shown that patients under spinal anesthesia, when subjected to the same stimulus, may call it touch, heat, or pain. If one must compromise, Head's concept is perhaps the one to be accepted.

Other points in the conduction of the pain

impulse are to be considered.

Propagation or after-discharge of the nerve impulse with a persistence of pain when the initiating factor is gone is probably explained on the basis of the internuncial pool. This sustained activity is maintained within internuncial neurons. These are neurons interposed between the afferent and efferent units taking part in reflex activity. Groups of these cells are called the internuncial pools. The pool provides both spatial and temporal dispersion of impulses so that one impulse may reach horn cells at different times and at different levels, therefore sustaining that impulse.<sup>3</sup>

The concept of the internuncial pool has been used to illustrate certain forms of *inhibition*. One property of the neurons of the first order

is to inhibit a sensory impulse before reaching the secondary neuron. They are actively engaged in the integrative functions affecting all normal sensory impulses. It has been suggested that the discriminative sensations of touch, posture, and so on, normally exert an inhibitory influence on the pain impulses so that the latter must be relatively strong to break through into consciousness. Although no experimental evidence is in the offing, this is probably true, otherwise everyday living and learning would be difficult because then every other impulse would be painful.

The size of nerve fibers has an interesting bearing on pain. There is an exact relationship between fiber size and the rate of conduction of nervous impulses. 'A' fibers are myelinated, measure from 1 to 20 microns in diameter and transmit impulses at a speed of from 5 to 100 meters per second. 'C' fibers include the smallest myelinated fibers and the unmyelinated fibers. These conduct at a rate of from 0.5 to 20 meters per second. 'B' fibers overlap the others both in size and rate of conduction. Pain may be transmitted through 'B' and 'C' and the smaller 'A' fibers. Therefore, the rate of conduction may vary from 0.5 to 30 meters per second. "Hence it would be anticipated that when a strong stimulus is applied to the body surface so as to initiate impulses in different types of pain conducting fibers, separate trains of impulses would travel centrally but each at its own rate, so that when they reached the sensorium distinct sensations of pain would be experienced." This has brought out the terminology of the fast and slow pain. The fast pain sensations, those reaching the sensorium rapidly, are the more vivid, less persistent, and more readily localized. The slow pain is diffuse, difficult to localize exactly, and reverberating.

#### CLINICAL CONSIDERATIONS

The pain threshold is the lowest perceptible intensity of pain. Although some investigators consider the threshold to pain a fairly constant physiologic phenomenon, there is extensive clinical support for the thesis that the pain threshold varies greatly in different persons and in the same person at different times. This variation in pain threshold seems to be associated with personality traits, alterations in emotional texture, environmental factors, and fear. Leriche has said, "Physical pain is not the simple affair of an impulse traveling at a fixed rate along a

nerve. It is the resultant of the conflict between a stimulus and the whole individual." In the measurement of pain threshold, a distinction must be made between perception of and reaction to pain, the two major aspects which must be kept in mind. Dissociation between pain perception and a reaction to pain is frequently found.

Pain has been divided into that which is cutancous and that which is deep. The former has been discussed under speed of conduction of nerve impulses. It is stated that one type of cutaneous pain is pricking in quality and fast; the other type is burning and slow.<sup>1</sup>

Wolff, in agreement with Lewis, 10 has divided deep pain into three categories: true visceral and deep somatic pain, referred pain, and pain due to secondary muscular contraction that provides

a fresh source of noxious impulses.

The true visceral and deep somatic type of pain is felt at the site of primary stimulation and may or may not be associated with referred pain. It is stopped by injection of procaine at the site of stimulation or by blocking the afferent nerves. It is not altered by infiltration of procaine into other structures supplied by the same or adjacent neural segments.

Referred pain may occur in addition to or in the absence of the true visceral and deep somatic pain. It is experienced at a site other than that of stimulation, but in tissues supplied by the same or adjacent neural segments. If it occurs without associated hyperalgesia and hyperesthesia, then injection of procaine into superficial or deep regions of referred pain will not relieve the pain. If hyperalgesia and hyperesthesia are present, then procaine injection will at least partially remove the discomfort.

Pain due to secondary skeletal muscular contraction that provides a fresh source of noxious impulses may result from secondary effects of the central spread of excitation on the effector structures, including painful contractions of skeletal muscles. Such disturbances may be widespread and the pains may be experienced in situations remote from the original source of noxious stimuli. Local infiltration of the contracted muscle with procaine abolishes this type of pain by disrupting its peripheral mechanism.

#### PAINFUL STATES

Of the pain syndromes, themselves, causalgia is perhaps the most interesting. The symptom complex was first named by and in part described by Mitchell in 1872.<sup>11</sup> The phenomenon

is a result of a penetrating wound involving a peripheral nerve. It most commonly follows an injury by a high velocity missile. The outstanding feature of the disorder is burning pain, usually slow in character, poorly localized, irradiating, throbbing, or aching. The pain may begin with injury or be delayed several weeks. It may last up to two years. It tends to increase in duration and in the area involved. The pain is usually referred to the distal part of the extremity and is usually more intense in the autonomous zone of the injured nerve. The involved parts show extreme hyperesthesia so that the slightest motion or draft of air causes extreme pain. The patient may gingerly hold the extremity in one position for hours on end. The personality is frequently greatly altered to the point of marked instability due to the constant, intense pain. Pronounced trophic and vasomotor changes in the painful part, such as glossy skin and elevation of temperature, are common. The symptom complex has the devastating ability to leak around any type of surgical block that may be employed.<sup>5,12</sup>

What happens to the organism to produce this syndrome? There appears to be a fundamental abnormality, some sort of overactivity that the cells develop. Lorento de No<sup>13</sup> has invoked the principle of reverberating circuits to explain it. One neuron activates a second; this a third; and so on until the last one reactivates the first, leading to a trapped impulse running around and around in neuron circles. It is an attractive theory and could explain causalgia; a single impulse starts some neuron chain reverberating; additional impulses coming in out of phase or in other positions would tend to disrupt, but continued impulses in appropriate channels would tend to reinforce and maintain it. Such reverberating nets would constitute the maintained abnormal dynamic states of the cord neurons.

Gerard<sup>5</sup> has another explanation: "In the cord, under causalgic conditions a hypersynchronization, a firmer locking together of a larger than normal number of neurons, has occurred to form a pulsating pool, and that this synchronization has become exaggerated by virtue of the lack of disturbing impulses to disrupt the synchrony and by reinforcement with those specific pain afferents that are feeding in to lock the neurons. Such a pulsing pool could recruit additional units, could move along in the gray matter, could be maintained by impulses different from and feebler than those needed to initiate it, could

discharge excessive and abnormally patterned volleys to the higher centers. In short, such a hypersynchronization could be physiological inflammation that would account for the phenomena" of causalgia.

The most recent treatment for causalgia is an attack on the sympathetic nerves. Nerve block is always transitory and sympathectomy is usually resorted to. Periarterial sympathectomy, first suggested and performed by Leriche is still successful in a fair number of cases. Livingston advocated neurolysis and nerve resection, but Mayfield<sup>12</sup> and Rovenstine<sup>14</sup> believed the method to be unsatisfactory.

The minor causalgias, a term coined by Homans, <sup>15</sup> are burning, posttraumatic reflex dystrophies. Minor causalgia differs from true causalgia in not being as severe and in having a definite vasospastic element. They may have nothing to do with peripheral nerves. Usually no more than three sympathetic nerve blocks are

necessary for adequate therapy.

Phantom limb is the sensation of an amputated limb still being present. Pains in phantom limbs are bizarre, the most common being associated with a sensation of a fixed position with crampy spasm. The next most common sensation is that the extremity is flopping around. Sometimes the patient has the feeling that the fingernails are tearing into flesh. The phantom limb may feel hot or cold. The generally accepted mechanism of phantom pain is based on locomotion. The ability to move an extremity automatically is based on a coordinated set of impulses set up by vision, posture, and body surface sensation. If any of these are interfered with, coordination is broken up and the learning process must be repeated. This coordination is also subject to central inhibition. If the patient is unable to overcome psychogenically these alterations in surface and postural impulses, then pain ensues. The pain pathways involve the sympathetic nervous system. Treatment of phantom pain usually is injection of these sympathetic nerves. On occasion thorough infiltration of the stump gives relief. Revision of the stump, chordotomy, and lobotomy give poor results.14 A new form of therapy, as yet untried, is based on the fact that the nerve impulses to the sensorium are confused, mixed up. It is suggested that pounding the stump to the limit of the patient's tolerance will provoke a standard set of impulses and, in such a manner, will perhaps serve to establish a new pattern to the cortex.16

#### ATTACK ON PAIN

The therapy of pain involves elimination of the stimuli, interrupting the pain pathways either temporarily or permanently, raising the pain threshold, modifying the reaction to pain, deadening perception to pain, and so forth.

Abolition of the pain stimulus, if at all feasible, is obvious but frequently forgotten. A second method of attack is interruption of the physiologic stimuli by nerve block and/or surgical resection. Nerve blocking must be applied with meticulous attention to anatomic detail if the best results are to be obtained. In the final analysis, it is not definitive treatment for pain. It has its greatest value as a diagnostic aid to the surgeon in anticipating the type of operation needed.9 There are many instances when operation is not feasible (as in terminal carcinoma which is amenable to nerve block, or in instances where interruption of a vicious cycle can be accomplished with an injection), but, in most instances, nerve block is preliminary to operation. Surgical interruption of the pain pathways may be accomplished at: the peripheral nerve, the posterior roots, the spinothalamic tract, or the sensory cortex.<sup>3</sup> Operations on the sympathetic nerves are becoming more and more numerous, based on the facts that, first, these nerves regulate the tonus of blood vessels and, second, that sensory neurons conducting pain impulses from the internal organs traverse the sympathetic chain to reach the spinal cord. Therefore, indications for sympathetic interruption would be vasospastic entities and uncontrollable visceral pain.

A third approach to the therapy of pain has as its aim the raising of the pain threshold. This is regularly accomplished with drugs which depress brain centers concerned with the reception of impulses carrying pain. Intimately connected with raising the pain threshold by the use of analgesics is a modification of the reaction pattern. Not only does morphine produce pain relief but also a euphoric state, thus changing the patient's reaction to the painful stimulus. Understanding and insight into the nature of the problem are also aids in combating pain. Lobotomy and topectomy are the most drastic of the attempts to alter the reaction pattern. Following topectomy, patients still have pain but it no longer "bothers" them.9

General anesthesia, rendering the individual totally insensitive; specific therapy such as adrenocortical extract in arthritis; and physical medicine are also tools to be considered.

#### CONCLUSION

Pain is difficult to define accurately. It may or may not be a protective reflex. The subjective reactions to pain vary from person to person, group to group, and race to race. Pain is conditioned by experience and strong beliefs. It is a specific sensation, usually passed along specific pathways, but noxious impulses may pass along different pathways or arise from different sources. Primary aim is to remove the source of stimulus.

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## Reviews of New Books

CHRONIC ILIAC PAIN IN WOMEN, by H. B. ATLEÉ, M.D., F.R.C.S., F.I.C.S., head of the department of obstetrics and gynecology, Dalhousie University, Halifax, Nova Scotia, Canada, 1953. Springfield, Illinois: Charles C Thomas. 65 pages. Price \$2.50.

This small book adequately discusses chronic iliac pain in women, which usually occurs on the right side. The author says no other symptom is so frequently complained of by women to a surgical specialist. He offers a list of conditions that should be considered differentially in establishment of a diagnosis for these patients. They are: (1) chronic appendicitis; (2) "adhesions"; (3) painful ovary or fallopian tube or both; (4) "cyst" of the ovary; (5) uterine prolapse, retroversion, tears and erosions of the cervix, and chronic cervicitis; (6) painful conditions of the ureter; (7) neuralgia of the abdominal wall due to neuritis of the cutaneous branches of one of the lower dorsal or upper lumbar spinal nerves; (8) the cecal syndrome, caused by irritation or spasm of the cecum; and (9) iliac pain as a manifestation of a neurosis.

A discussion of how the problem should be approached follows, and the suggestion is made that if the counsel of a psychiatrist is indicated, the one selected should be well adjusted in respect to recognition of factors outside his own field. The author then discusses very briefly each of the 9 points already mentioned, so that the reader is left with the impression that the subject has been well covered. Finally, the author sums up what he has to say in 13 paragraphs.

There is no index. None was necessary. The paper stock is good. The type face is easily read. The book is convenient to handle, with its black flexible cover and

pocket size. This book should be of real service to all physicians in general practice or in obstetrics and gynecology or general surgery.

JOHN S. LUNDY, M.D.

THE PRACTICAL MANAGEMENT OF PAIN IN LA-BOUR, by W. D. Wylie, M.R.C.P. (Lond.), D.A., anaesthetist to St. Thomas's Hospital and The National Hospital for Nervous Diseases, London. Chicago: The Year Book Publishers, Inc. 148 pages; 42 figures. Price \$3.50.

This small book serves to concentrate attention on the relief of pain of the obstetric patient. The anatomic and physiologic aspects of the problem are discussed. One chapter is devoted to analgesic and anesthetic agents; another, to apparatus used; another deals with relief of pain in normal labor; and the one which follows is concerned with abnormal pregnancy and childbirth. One chapter is devoted to cesarean section. In the chapter on local analgesia, the point is stressed that few of those engaged in anesthesia develop equivalent skills in producing analgesia. The final chapter deals with therapeutic analgesia and anesthesia. Trichlorethylene is referred to in several places and the material on this subject is particularly good.

The paper is of good quality and the printing, excellent. The book is easily read and is well indexed. In general, it covers its subject adequately. Outmoded or little-used drugs and technics are eliminated from the discussion. A variety of equipment is illustrated. This little volume should be of real interest to those concerned with administration of anesthetics.

JOHN S. LUNDY, M.D.

#### Editorial

All inquiries and manuscripts for the Section on Pain should be sent to Dr. John S. Lundy, 102 Second Avenue S.W., Rochester, Minnesota, or to the Editorial Department, The Journal-Lancet, 84 South Tenth Street, Minneapolis 3, Minnesota.

#### WILL THERE BE AN ERA OF ANALGESIA?

In the last one hundred years people have had the benefit of anesthesia. This is fully recognized as one of the great advances of mankind over the ages. It would appear now that there is promise of an

era of analgesia.

In the past, efforts have been made to develop analgesics, but probably not enough attention has been given to the problem. The advantages of a state of generalized analgesia are many, but perhaps the most important advantage of analgesia over anesthesia would be the fact that the patient would not be subjected to as much risk of life from an analgesic as from an anesthetic unless he were drug sensitive. Agents which would produce generalized analgesia might prove to be very useful for the burned patient, the patient with pronounced pruritus, and the ambulatory patient and also in obstetrics for minor operations performed in the physician's office and for many dental procedures. Some

anesthetic agents such as nitrous oxide, Vinethene, and trichlorethylene can be given in analgesic closes. Nitrous oxide, however, is not as effective as could be desired, and Vinethene and trichlorethylene must be used for such brief periods that their usefulness is limited.

On July 30, 1953, I had the opportunity to inject intravenously an agent known as MRD-125 (5-ethyl-6-phenyl-m-thiazane-2,4-dione). It became evident quickly that considerable generalized analgesia of the skin was produced. The same day the agent was used on 2 patients for extraction of teeth, and it was clear that the dental operation could be carried on and that the patients would open and close their eyes and swallow on command. Subsequently, 80 per cent nitrous oxide and 20 per cent oxygen were used and the dose of MRD-125 could be reduced to a third or a fourth of the amount needed when it was used alone. Aside from the facts that the drug is scarce and that, as yet, it is difficult to put and keep in solution, it became apparent that if given with the right material it would be possible to produce a state of generalized analgesia. It is in the hope of encouraging chemists to give us such a drug or drugs and for the purpose of creating a demand for generalized analgesia so great that the pharmaceutical houses will make the effort to meet it, that attention is called to the desirability of bringing about an era of analgesia.

JOHN S. LUNDY, M.D.

#### Current Literature on Pain

EFOCAINE COMPLICATIONS FOLLOWING ITS USE. Daniel C. Moore, M.D. West. J. Surg. 61: 635-638, 1953.

Most reports during the past two years on the use of Efocaine to relieve postoperative pain have been favorable. Serious complications occurring after Efocaine injections have been reported at medical meetings, and one has appeared in print. These unfavorable results have made little impression, either because the article has not been widely read nor heard, or because favorable reports are more numerous. Also, the pharmaceutical company producing the drug, although aware of its potential danger, continues to advertise it as a "safe" drug which is free from the hazards of encapsulation, abscesses, foreign body reactions, tissue sloughs, or other adverse effects.

Efocaine is a mixture composed of 1 per cent procaine, 0.25 per cent procaine hydrochloride, and 5 per cent butyl-p-aminobenzoate as the anesthetic base. The aqueous miscible solvents are 2 per cent polyethylene glycol-300 and 78 per cent propylene glycol. The preservatives are 0.1 per cent sodium metabisulfate and 1:2500 phenyl-

mercuric borate.

The purpose of this paper is to review cases of the complications of Efocaine which we have collected, and again warn that even death may result from its use.

The injection of Efocaine has resulted in two deaths. One occurred after a unilateral cervical block of the third, fourth, and fifth cervical nerves to stop intractable hiccoughs in a patient with coronary occlusion. In this case, as the last cervical nerve to be blocked was injected, the patient complained of severe pain in his neck and became less and less responsive during the next fifteen minutes and lapsed into a coma. During the next six hours, the coma deepened and the patient finally expired. An autopsy report was not made available, but death was attributed to the fact that Efocaine entered a blood vessel with ensuing thrombosis of the vessels in the brain.

The other death occurred after the blind injection of Efocaine in the right eighth intercostal space 8 cm. from the midline of the back, in an office patient who had severe pain after thoracoplasty. During the injection, after 1.5 cc. of Efocaine had been injected, the patient suddenly complained of severe, knife-like pains in the legs. He collapsed and became paralyzed within a few minutes. He complained of shortness of breath and was immediately taken to the hospital by ambulance. He died forty-four hours after the injection. Autopsy revealed thrombophlebitis of the intercostal vein at the site of injection and pronounced necrosis and inflammation of the spinal cord.

The next most serious complications from the drug have been 11 cases of transverse myelitis – 1 occurred after a paravertebral lumbar sympathetic block, the oth-

ers after intraneural injections of the intercostal nerves just before closing thoracic incisions for the purpose of relieving postoperative pain. These patients, some of whom were injected as long as one and one-half years ago, are still paralyzed from the level of the injection caudad. In isolated cases, minor improvements such as regaining bladder control have occurred, but use of the extremities is still absent. Tuberculosis caused the death of 1 patient three months following the onset of paralysis, and autopsy revealed an area of avascular myelomalacia at about T5. The dura and meninges showed no evidence of arachnoiditis, and the cord above and below T5 was normal as was the cauda equina.

At the Mason Clinic we have had 9 cases of severe intercostal neuritis after injection of the drug in 41 patients. Interesting to note is the fact that in these patients the neuritis did not occur until ten days to two weeks after the injection, and that the pain was burning in nature and resembled causalgia. This type of pain lasted two to six weeks. Lawyers were consulted by 2 of these patients and legal action was intimated. Of these 41 patients, 4 showed areas of numbness in one or more of the dermatomes innervated by the intercostal nerves injected. This condition persisted from four to eleven months before motion and sensory function returned. Subcutaneous hemorrhage followed injection in one of our patients, and before it stopped an ecchymotic area approximately 8 in. by 10 in. resulted.

Efocaine for relief of postoperative tonsillectomy pain has been recommended. However, Marks found that pronounced relief of pain was experienced by 14 patients in whom 1 ec. of the drug was injected bilaterally at the base of the tongue and the attachment of the posterior pillar. In 6 of the 14 patients, severe hemorrhage started from six to twenty-seven days postoperatively. In 5 of the 6 patients, hemorrhage was bilateral. Large, pale areas of slough occurred in almost all patients on the seventh postoperative day.

Severe cellulitis following block of the facial nerve, coccygeal nerve bilaterally, and the perirectal area have been noted by Hubbard after Efocaine injections. The signs and symptoms of cellulitis lasted seven to ten days. Sloughs and ischiorectal abscess succeeding injection of the drug into the rectal sphincter to relieve the post-operative pain of hemorrhoidectomy have occurred.

When death and myelitis have occurred after Efocaine, physicians have blamed themselves for intravascular injections or subdural injections. Deposition of the solution into a blood vessel could conceivably be responsible for the difficulties, since one mortality autopsy revealed a recent thrombus in the intercostal vein. Also, the possibility of subdural injection during a paravertebral block is feasible, but a subdural injection via a long cuff of dura during an intercostal block 6 to 8 cm. from the intervertebral foramen is not easily acceptable. Our experiments on monkeys have shown that when a solution of Efocaine colored with methylene blue is injected intraneurally in either the third or fourth lumbar nerve approximately 4 cm. from the intervertebral foramen, it spreads centrally, within seconds to minutes, into the nerve tissue inside the dura. It remains within the coverings of the nerves, and the spinal fluid does not beeome tinged with methylene blue until osmosis occurs.

Experimental studies and clinical results with Efocaine indicate that one vital pharmacologic requirement has not been met — safety.

MANAGEMENT OF INTRACTABLE PAIN WITH ANALGESIC BLOCKS. John J. Bonica, M.D. J.A.M.A. 150:1581-1586, 1952.

Blocking nerve pathways with locally injected anesthetic agents is an effective method of relieving intractable pain. Undesirable side effects which often accompany other technics for handling these problems are avoided.

Advantages of nerve blocking injections in properly selected eases include minimal or no hospitalization, no addition to dysfunction, and absence of interference with other forms of treatment.

Nerve blocks may also be employed for diagnostic and prognostic purposes. For example, an atypical pain about the face and head may be identified as originating in the glossopharyngeal nerve or the trigeminal nerve. The patient is given an opportunity to experience the effects of nerve interruption, which aids him in making a decision regarding future surgical section of the nerve.

Disorders in which local nerve blocks are useful may be grouped as follows: (1) neuralgias, (2) causalgia and other reflex sympathetic dystrophies, (3) pain resulting from vascular disease, (4) visceral pain, (5) musculoskeletal pain, and (6) pain due to malignant growths.

A thorough knowledge of anatomy and neurophysiology is essential, as well as proper selection of the blocking agent to be used. Without these, such complications as chemical neuritis possibly with paralysis, accidental pneumothorax, total spinal anesthesia, circulatory or respiratory failure, and even death can occur.

For injections intended to produce relatively brief blocks, 1.0 or 2.0 per cent aqueous procaine hydrochloride, 0.1 or 0.2 per cent lidocaine (Xylocaine) hydrochloride, and 0.1 or 0.2 per cent tetracaine (Pontocaine) hydrochloride are recommended. At the other extreme, the subarachnoid injection of alcohol compares favorably in duration with surgical rhizotomy. For medium duration of the block (from days to weeks), Efocaine, 6 per cent aqueous phenol, and 0.75 to 2.0 per cent benzyl alcohol are satisfactory. Since absolute alcohol injections are occasionally followed by pronounced and prolonged postinjection neuritis, this agent should be reserved for severe intractable pain where surgery is not desired.

ZUR BEHANDLUNG DER SOGENANNTEN PERI-ARTHRITIS HUMEROSCAPULARIS (TREATMENT OF SO-CALLED HUMEROSCAPULAR PERIAR-THRITIS). H. W. Passler and G. Sich. Die Medizinische 33/34:1057-1058, 1953.

Stellate block anesthesia has shown very good results in the treatment and cure of calcareous bursitis and other nonclassified stiffnesses of the shoulder. After having used novocain and Symprocain (procaine and benzyl alcohol) for several years, the authors changed to performing stellate block anesthesia with Depot-Impletol (procaine with caffeine and Polyvinylpyrrollidone) since the end of 1952. Several complications had been observed before, which are believed to be attributed mainly to the amount of benzyl alcohol (phenmethylol) contained in Symprocain, which has a destructive effect on the nervous system. So far, Depot-Impletol has been used for 150 stellate blocks, with no complications observed.

Such good results have been obtained with this treatment in humeroscapular periarthritis and allied stiffnesses of the shoulder, that we have almost entirely replaced former modes of treatment with stellate block anesthesia.

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## American College Health Association News . . .

The Fourth National Conference on Health in Colleges will be held in New York City on May 5 through 8, 1954, with headquarters in Hotel Statler. The purpose is to bring together the best current ideas as to how the highest standards of health may be developed and

maintained in colleges.

Registration begins Wednesday morning, May 5. The opening general session will be held Wednesday afternoon at 2:30 p.m. followed by initial meetings of the committees from 4:00 to 5:00 p.m. There will be a general session for all conference participants on Wednesday evening at 8:00 p.m. At this time President Morrill of the University of Minnesota and a number of his colleagues will discuss "The President Looks at the College Health Program." The conference will close with a luncheon meeting on Saturday which will include a summarization of the conference highlights and an address by an outstanding speaker.

Committee work will continue all day Thursday and Friday, with reporting at a general session on Saturday morning, May 8. Sixteen committees are hard at work preparing agenda for the discussions at the conference.

The committee chairmen are as follows:

1. The Administration, Organization and Functioning of the College Health Service — chairman: Dr. Ralph Canuteson, University of Kansas, Lawrence.

2. Training Program in Student Medicine for Physicians and Nurses—chairman: Dr. Irvin Sander, Wayne University, Detroit.

3. Students with Special Health Problems — chairman:

Dr. Max Durfee, Oberlin College, Ohio.

4. Insurance and Other Prepayment Plans in Student Health Services — chairman: Dr. George H. Houck, Stanford University, Palo Alto, Calif.

5. How Can Student Health Practices be Influenced through Health Education? — chairman: Dr. Ernest Stew-

art, Columbia University, New York City.

6. Educational Potentialities of the College Health Program — co-chairmen: Dr. Ruth Grout; Dr. Stewart Thomson, University of Minnesota, Minneapolis.

7. Community Resources which may Contribute to College Health – chairman: Dr. Walter Hager, Wilson

Teachers College, Washington, D. C.

8. Contributions of Physical Education and Recreation to the College Health Program — chairman: Carl Nordly, Ph.D., University of Minnesota, Minneapolis.

 Role of the College Health Nurse—chairman: Marie Swanson, National League for Nursing, New York City.

- 10. The Dean of Students and the Health Program chairman: Dean John E. Hocutt, University of Delaware, Newark.
- 11. Student Participation in Health Planning chairman: Dr. Edward B. Johns, University of California, Los Angeles.
- 12. Correlation of Counseling Functions on a College Campus chairman: Mr. Vernon E. Keye, Wayne University, Detroit.
- 13. Research Programs in College Health chairman: Dr. Nevitt Sanford, Vassar College, Poughkeepsie, New York.
- 14. The Development of the College Mental Hygiene Program chairman: Dr. Lewis Barbato, University of Denver, Colorado.
  - 15. Relation of College Environment to Student

Health—chairman: Mr. Fred Ingram, University of California, Berkeley.

16. Use of Student Health Records – chairman: Dr. Fred Hein, American Medical Association, Chicago.

The final publication will be a summary of the deliberations of the conference and will no doubt set standards for college health programs for the next decade.

Anyone specifically interested in the health of college

students is eligible to attend.

Dr. George T. Blydenburgh, director of Student Health at Ohio Wesleyan University, Delaware, Ohio, died sud-

denly of a heart attack January 22.

When a boy Dr. Blydenburgh was undecided as to the choice of a career. He debated between the ministry and medicine. He chose the latter and became a medical missionary in Kiangsi, China, for eleven years after his medical training was completed. There he planned and superintended the building of a large modern hospital. He returned to the United States in 1933 because of political unrest and repeated civil wars in China.

Dr. Blydenburgh was graduated in the class of 1914 of Wesleyan University, Middletown, Connecticut, where he was elected to Phi Beta Kappa. He graduated from Cornell University Medical College in 1918. He also received a Master of Public Health degree from Yale University. He served internship and residency in several New York hospitals before going to China.

In 1935 he was appointed to Ohio Wesleyan where he was actively engaged in student health work until his death. From 1945 to 1948 he was secretary-treasurer

of the American College Health Association.

Dr. Blydenburgh is survived by his widow, Mrs. Marion Patterson Blydenburgh; two sons, George, Jr., a Doctor of Medicine of the University of Cincinnati, and Stuart, a graduate engineer of Case Technical Institute; a daughter, Mrs. James I. Patterson of South Bend, Indiana; two grandchildren; a brother; and three sisters.

A recent decision of the state board of education has authorized the naming of the Health Residence of Michigan State Normal College as the Glenadine C. Snow Memorial Health Residence.

Dr. Snow, who died May 10, 1953, was former director of the Health Service at Michigan State Normal College and active in the American College Health Association as well as Michigan College Health Association. A living memorial is the wish of her many friends and colleagues, who have felt that her distinction as a physician, health director, and counselor fully merits such recognition. Therefore, a Memorial Fund is being raised. Dedication will take place on May 2, 1954, when the Michigan College Health Association holds its state meeting on the Ypsilanti campus.

It is hoped that the Memorial Fund will also allow the establishment of a loan fund for Michigan State Normal College students to provide special and critical health care and diagnostic aids not otherwise available.

All contributions should be sent to the chairman of the Glenadine Snow Memorial Fund Committee, Edith A. Erikson, 109 N. Summit St., Ypsilanti, Michigan.

California Institute of Technology, Pasadena, has been (Continued on page 160)



A new form of a synthetic narcotic analgesic . . . approximately twice as potent as racemic Dromoran (dl) Hydrobromide 'Roche' . . . inducing prompt pain relief with longer duration of analgesic effect than morphine.

... indicated for the relief of severe or intractable pain ... preoperative medication and postoperative analgesia.
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#### ACHA NEWS

(Continued from page 158)

approved as a member of the ACHA by members of the executive committee. California Institute of Technology has an enrollment of 548 undergraduate men students, 415 graduate men students, and 1 woman graduate student. Its Faculty Health Committee, which has a Health Service Staff representative, meets monthly. A course in Personal and Community Health is required of all students. There are 1 full time and 2 part-time physicians, 4 full-time nurses, and 1 part-time nurse, and a psychologist from the office of deans on the staff. We take this opportunity to welcome California Institute of Technology into the Association.

Dana L. Farnsworth, M.D., medical director, Massachusetts Institute of Technology, is the author of an article on "What is Mental Health in a University?" which appeared in the January 1954 issue of Mental Hygiene. It is taken from an address given at the University of Nebraska, Lincoln, Nebraska, in March 1953 on the occasion of the inauguration of a mental health program for the university.

Wheaton College, Norton, Massachusetts, has an opening for a resident physician, preferably a woman, who would devote about half time to the college and the remainder to a local practice. A new infirmary is under construction and will be available for use next September. Contact A. Howard Meneely, president of Wheaton College, for further information.

There is an opening for a qualified physician at University of Florida, Gainesville, because Dr. Sanford E. Ayers, head of the Department of Student Health, is leaving in June to enter private practice.

The infirmary is a modern well-equipped unit of 75 beds with a nurses home attached. The present staff comprises 5 physicians, a psychiatrist, a part-time radiologist, an executive assistant, 2 full-time technicians, a supervisor of nurses, a physical therapist, 18 full-time nurses, a dietitian, housekeeper, a sanitary inspector, office personnel, an x-ray technician, 2 cooks, plus 13 additional employees.

The position carries the rank of full professor, with vacation periods similar to other faculty. Interested persons should contact Dean D. K. Stanley.

0 0 0 0

The University of California, Berkeley, is the recipient of a grant from the Public Health Service for a study to evaluate the role of x-ray surveys on the campus. The two main objectives of the study are: (1) To evaluate the procedure of photofluorographic examination of students and to determine the optimal frequency for such examination. (2) To determine the clinical significance of lesions missed in a mass survey and thus determine the most efficient way of utilizing multiple reading of mass survey films.

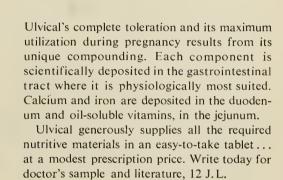
The study is assured almost 100 per cent participation on the part of the students since the president and the chancellor have ruled that x-rays will be required before the student will be allowed to complete his registration for the spring semester. This project is being conducted cooperatively by Jacob Yerushalmy, Ph.D., division of biostatistics, school of public health; William G. Donald,

(Continued on page 162)

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#### ACHA NEWS

(Continued from page 160)

M.D., University physician and director of student health service; and James Harkness, M.D., part time university physician in charge of tuberculosis on the campus.

0 0 0

The 1953 Proceedings of the American College Health Association have been listed in the current *Vertical File Service Catalog*, page 5, of The H. W. Wilson Company.

The 1954 officers of the Pacific Coast Section are: president, Paul O. Greeley, M.D.; president-elect, Charles M. Lester, M.D.; secretary-treasurer, Ruby Rich Burgar, R.N., and member-at-large (1 year term), Edith M. Lindsay, Ed.D.

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Duane Hartshorn, M.D., director of health services, Colorado A. & M. College, Fort Collins, was elected president of the Rocky Mountain Section with instructions to select his own secretary. The meeting in 1954 will be held at Colorado A. & M. College.

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We were interested to receive the Bradley University Bulletin describing the "new, spacious health center," which is the former AFROTC quartermaster section building. It is housed on two floors. The first consists of a waiting room, nurse's office, dispensary, and physician's consultation room. The infirmary and living quarters for the nurses occupy the second floor. The entire building has been remodeled, redecorated, and painted on the outside. Center services are voluntary, except in cases of communicable diseases, when the university doctor and the city Board of Health have general charge. All new students must have a physical examination by their family physician and furnish a complete medical record to the Student Health Center physician and nurse; all new faculty members and full time employees must participate in the tuberculosis association chest x-ray program; and all new employees involved in food handling are required to take a blood test, in addition to the physical examination and chest x-ray.

By now members of the American College Health Association have a complimentary copy of the *Formulary* issued by the Pharmacy-Health Service. The Service desires to receive your comments and suggestions.

#### EDITOR'S NOTE

The editors regret that space limitations in the March issue prevented inclusion of the "Conclusions" with the article "Intravenous Iron for Extreme Anemia in a Patient Who Refused Blood Transfusion" by Dr. Reuben Berman. For the convenience of our readers we are printing the omitted paragraph below.

#### CONCLUSIONS

A case of iron deficiency anemia treated successfully with intravenous iron is presented. The patient had an obstructing duodenal ulcer complicated by multiple massive hemorrhages. Unusual features of the case are the refusal of blood transfusion on religious grounds by an adherent of "Jehovah's Witnesses," the low level of 3.3 gm. of hemoglobin treated exclusively with intravenous iron, and the excellent clinical result obtained in an apparently moribund patient.

## News Briefs . . .

#### North Dakota

The New Clinic building of the Missouri Valley Clinic became ready for occupancy March 1. The interior is modern in design with cheerful colors predominating. The first floor includes a spacious reception lounge, laboratories, and the business office. The x-ray department, therapeutic rooms, medical library, examining rooms, and an auxiliary waiting room are in the downstairs area.

Dr. C. M. Lund, of Williston, presented a magician's show March 13 in Bismarck on behalf of the North Dakota Cancer Society. Dr. Lund's talent as a magician started as a hobby and includes his entire family. His children assist him on the stage and his wife makes the costumes. He is chairman of the medical and scientific committee of the North Dakota Cancer Society. His principal task is to arrange programs for the annual cancer caravan, a group of doctors who travel and do educational work for the society.

Dr. L. J. Prochaska has established a practice in ophthalmology in Grand Forks. Previously Dr. Prochaska served a rotating internship at Minneapolis General Hospital followed by general practice at Baudette, Minnesota. For the past three years, he has been a resident physician in ophthalmology at Minneapolis General Hospital.

Dr. S. M. Chasten, an orthopedic surgeon, has joined the Grand Forks Clinic. Dr. Chasten served in the Armed Forces during World War II and the Korean conflict. He was separated from the service in 1951. He was chief orthopedic surgeon at Camp Carson, Colorado, and later practiced in Janesville, Wisconsin before going to Grand Forks.

### Minnesota

Two University of Minnesota surgeons have each been awarded \$30,000 grants by the John and Mary R. Markle Foundation of New York. The award winners are Drs. Gilbert S. Campbell and Mitchell W. Spellman. Both surgeons are on the staff of Dr. Owen H. Wangensteen, chief of surgery at the university. This year the Markle grants are being awarded to 25 faculty members of medical schools in the United States and Canada. Each grant is awarded at the rate of \$6,000 annually for five years.

Dr. Frank Hammond Krusen, of the Mayo Clinic, Rochester, received the President's award of 1953 for contributions to the rehabilitation and employment of physically handicapped persons. The citation, signed by President Eisenhower, was presented at a dinner in connection with the annual meeting of the Congress on Industrial Health. Dr. Krusen is head of the physical medicine section at the Mayo Clinic and professor of physical medicine at the Mayo Foundation.

DR. EDWARD ALLEN BOYDEN, head of the anatomy department at the University of Minnesota, received a special tribute in honor of his 68th birthday. He was presented with the "Boyden Birthday Volume" of the Anatomical Records, a scientific journal published for anatomists. Members of his department and former associates contributed papers for the volume.



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#### South Dakota

Open house was held recently at the new tuberculosis wing of the South Dakota State Sanatorium at Custer. Patients will now be housed in a fireproof building for the first time in the forty-three years the sanatorium has been opened. The new wing provides space for 124 beds which is expected to meet normal demands for some time to come.

Dedication ceremonies for the Medical Sciences building at the University of South Dakota were held March 27. The building was constructed on a block of land given in 1931 by Andrew E. Lee, the first governor of the state.

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Surgical Technic, Two Weeks, April 19, May 3, May 17. Surgical Technic, Surgical Anatomy & Clinical Surgery, Four Weeks, June 7.

Surgical Anatomy & Clinical Surgery, Two Weeks, June

Surgery of Colon & Rectum, One Week, May 10. Thoracic Surgery, One Week, June 7.

Esophageal Surgery, One Week, June 14.

General Surgery, Two Weeks, April 26, July 26. Fractures & Traumatic Surgery, Two Weeks, June 7.

GYNECOLOGY & OBSTETRICS—Gynecology Course,
Two Weeks, June 7.
Vaginal Approach to Pelvic Surgery, One Week, May 24.
Combined Course in Gynecology & Obstetrics, Three
Weeks, April 19.

MEDICINE—Two-Week Course, May 3.
Electrocardiography & Heart Disease, Two Weeks, July 12.
Gastroenterology, Two Weeks, May 17. Hematology, One Week, June 14.

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### Deaths . . .

Dr. Frank E. Weed, 65, prominent physician and civie leader of Park River, North Dakota, died March 9. For many years Dr. Weed maintained a clinic, although always working for a modern hospital for the city. St. Ansgar's Hospital was erected in 1952 largely as a result of his efforts.

Dr. G. A. Knutson, who practiced medicine in Hallock, Minnesota for ten years, died March 7. Death was apparently due to a heart ailment.

Dr. John B. Gregg, 65, Sioux Falls, South Dakota physian, died March 3. During World War I, Dr. Gregg was decorated personally by the King of England for conspicuous gallantry and devotion to duty. He established practice in Sioux Falls in 1920.

Dr. F. C. Willoughby, 77, pioneer South Dakota physician, died February 18. Dr. Willoughby began practice at Winfred in 1908, moving to Howard in 1926. In his many years of practice, he had never taken a vacation.

#### TUBERCULIN TESTING

(Continued from page 135)

culin and found to be a positive reactor, she would have been followed by x-ray films at three-month intervals after conversion of her tuberculin reaction or the first positive reaction. In this event, probably her disease would never have reached the far advanced and communicable stage which it reached during the time elapsing between the two x-ray films. When we consider that a single case of this type seriously endangers hundreds of others in a school system, we can see more acutely the value of very precise methods of examination and control.

May I state again — as the incidence of tuberculosis decreases, the value of tuberculin testing increases and the value of precisely controlling the disease by tuberculin testing and follow-up will likewise increase. Some groups other than schools which could benefit from this test are:

- 1. Hospital personnel, including doctors, nurses, and general hospital help.
- 2. Schools, including teachers, office help, janitors as well as students.
- 3. Many small and closely knit industrial groups such as banks, department stores, and small manufacturers.
- 4. Groups requiring special licensure examination, such as food handlers.
- 5. Entire populations of countries and states with low incidence.

(Continued on page 166)

"THE NEAREST APPROACH TO THE CONTINUOUS INTRAGASTRIC DRIP FOR THE AMBULATORY PATIENT"\*

## NULACIN

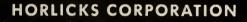
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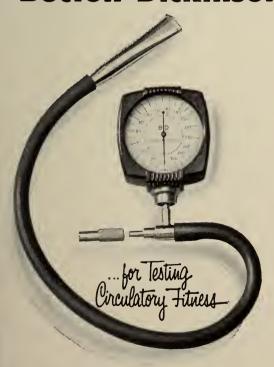
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#### TUBERCULIN TESTING

(Continued from page 164)

It is my hope that in our search for newer and better methods of controlling tuberculosis, we will not overlook the older, tested, and tried methods that have proved so successful in the past. It is my impression that tuberculin testing is one of these neglected methods that offers us perhaps more in its future application than it has ever given us in the past.

### ROUTINE TUBERCULIN TEST IN INFANCY (Continued from page 136)

lation warrants a corroborative intradermal test.

The Mantoux test may, of course, be employed in case finding. Old tuberculin solution of 0.1 mg. is suggested routine dosage. Reading is forty-eight to seventy-two hours after injection. Again the area of redness and induration at the site of the injection must be at least 0.5 cm. in diameter. If tuberculosis is suspected, either the patch test or a lower strength old tuberculin solution must be initially employed.

Finally, the routine tuberculin test in infants may aid in adult tuberculosis case finding.<sup>7</sup> Whenever an infant is found to be tuberculin positive, careful search by chest x-ray film of all adult contacts is indicated. Since the usual infant in this age group has been in contact with only a relatively small number of adults, the location of the tuberculous adult is often easy. The contact can then be promptly removed to the benefit of the infected child and all other possible future contacts as well as that of the tuberculous adult himself.

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# Obstetric and Pediatric Aspects of Therapy in Hemolytic Disease of the Newborn\*

E. PLATOU, M.D., W. R. HEILIG, M.D., A. J. SCHROEDER, M.D., H. AGUSTSSON, M.D., and W. S. WRIGHT, M.D.

Minneapolis, Minn.

TUCH confusion and misunderstanding still VI exists in the minds of many who are charged with the responsibility of managing Rh immunized mothers and infants potentially af-flicted with hemolytic disease of the newborn. This is understandable when certain unknowns are taken into account. The lack of correlation between some antibody titers with the gravity of the disease, the claims and counterclaims regarding possible methods of "desensitizing" the mother with hapten and hormones, and the disagreement that existed in the past concerning necessity of induction of labor or cesarean section have all contributed to the confusion. Moreover, the criteria for diagnosis of hemolytic disease and indications for exchange transfusion have been somewhat controversial. The problem of pathogenesis and susceptibility to kernicterus has perhaps added somewhat to the lack of complete understanding.

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#### MANAGEMENT OF IMMUNIZED MOTHERS

Although it is true that saline agglutinins in the mother sometimes correlate poorly with severity of the hemolytic process<sup>1-4</sup> in the infant, the same cannot be said with respect to incomplete or blocking<sup>5-8</sup> antibodies. Infants born of mothers with blocking antibody titers of over 1 to 32 generally have been severely afflicted.

At Northwestern Hospital, 107 cases of hemolytic disease of newborns have occurred since modern serologic technics have been employed. Patients who died from erythroblastosis fetalis and kernicterus or who are alive but suffering the effects of kernicterus total 26. The peak saline antibody titer of the mothers of these babies averaged 257.6. Of 84 patients with disease considered severe enough to warrant exchange or interval transfusions but who survived, the average peak saline antibody titer was 110. The average blocking antibody peak was 64 in the fatal cases and 32 in the recovered cases.

Although there were a few outstanding examples of high titers with mild disease and low titers with severe disease, high saline and blocking titers can be seen to be usually associated with cases that have a greater degree of morbidity and mortality. Women in whom a history of

<sup>\*</sup>From the Pediatric Department of Northwestern Hospital, Minneapolis, Minnesota.

TABLE 1

	Average peak saline antibody titer	Average peak blocking antibody titer
Fatal cases — 23	257.6	1-6-1
Living cases $-84$	110.0	1–32

blood injection or transfusion could be clicited almost invariably gave birth to severely afflicted babics regardless of antibody titer. Likewise most infants born of mothers with a moderate but persistent elevation of titer during pregnancy were victims of hemolytic disease, although notable exceptions did occur.<sup>1,3,4,9</sup>

The earlier attempts at induction before thirty-seven weeks resulted in more babies born alive, but this was offset by deaths from the hazards of prematurity<sup>4,10–12</sup> and kernicterus to which the premature is so susceptible. Early delivery by section in the earlier cases at Northwestern Hospital showed poor results as indicated in table 2 and has been abandoned.

TABLE 2
COMPARISON OF EFFECTS OF PREMATURE INDUCTION
AND SPONTANEOUS DELIVERY

Treatment	Number of cases	Living	Neonatal death	Mortality
Spontaneous	89	73	16	18%
Cesarean section	18	8	10	55.5%
Total	107	81	26	

Induction at thirty-eight weeks does seem rational in patients whose previous moderate titer has risen rapidly by the thirty-sixth week, although cesarean section should be avoided if possible. Reports from the literature<sup>1-4, 13-16</sup> thus far indicate that most attempts to neutralize antibodies with hapten<sup>17</sup> have failed to alter the disease in the fetus. In our series, some strongly suggestive results occurred with these lipoid extracts of Rh positive blood, but there were an equal number of complete failures. Serologists in this field<sup>18</sup> generally believe that this method has been completely discredited. Although most attempts to treat the sensitized mother with ACTH and cortisone have failed, the possibilities of this form of therapy have not been adequately evaluated. One report by Hunter and Ross<sup>19–20</sup> has offered some promise. Very recently Hunter<sup>21</sup> reported a reduction of case mortality of babies born alive from 10 per cent by exchange alone to 3 per cent when combined with cortisone. The dose given to sensitized mothers was 100 to 150 mg. divided into 4 daily doses beginning from the onset of elevated titers. Hunter used 17-ketosteroids and pregnancdiol levels in the maternal urine to follow the course of the fetus.

#### MANAGEMENT OF THE INFANT

Most babies born with active or incipient crythroblastosis show no symptoms or signs of the hemolytic process at birth. An oxalated or heparinized sample of cord blood<sup>22</sup> is the most valuable specimen for diagnosis and evaluation of the criteria for treatment. A positive direct antiglobulin – Coombs' test<sup>23</sup> – establishes the diagnosis definitely, and, although a negative test usually excludes the diagnosis, a "false" negative can occur and a negative test must not be relied upon if other factors such as a bad maternal history is elicited and homozygosis has been established in the father.

Additional tests which should be performed on the cord blood or on the infant capillary blood, if the cord blood was not kept, are as follows: hemoglobin, blood grouping, Rh typing, serum bilirubin, reticulocyte count, normoblast count, and "complete" blood. Of these tests, hemoglobin concentration is the single most valuable test.24 A majority of workers in this field now regard a cord hemoglobin of less than 14.5 gm. as an indication for exchange transfusion. A hemoglobin level of less than 15.5 gm., if taken from infant capillary blood, is likewise a well established index.1 A low serum bilirubin value in cord blood or capillary blood at birth may be misleading since most of the pigment may have escaped through the placenta.<sup>25</sup> The fact has recently been established that bilirubin is the pigment found in the brain in kernicterus.<sup>26</sup> Because it is known that any sharp rise or a level above 15 to 20-mg. per cent of total bilirubin is of serious prognostic omen,26 this finding should be regarded as a real indication for exchange.<sup>27</sup> Indeed, a high level after exchange is an indication for a repeat exchange.<sup>28</sup> The average total serum bilirubin in our fatal and kernicterus cases was 14.7-mg. per cent, whereas, in patients who survived, the average total was 10-mg. per cent per case. The average minimum hemoglobin was 10.6 gm. in the fatal cases and 14.8 gm. in the survivors. A high reticulocyte count in the presence of hemolytic disease was found to be a valuable adjuvant in deciding upon the need for exchange, whereas normoblastemia was a relatively unreliable guide. 18 Leaders in the study of hemolytic disease of the newborn now even recommend exchange transfusion when all usual criteria are lacking if the maternal history is bad and the father is homozygous. Prematures born under these circumstances are to be exchanged if the Coombs' test is positive in spite of normal hemoglobin and serum bilirubin levels.<sup>18</sup>

The better over-all results of exchange transfusion as compared to early interval transfusion in our Northwestern Hospital series is shown in table 3.

TABLE 3

Total case

Kernicteru

E.F. non

Total

Kernicteru

C 1	7 1	
Cases treated	by excha	nge
		Total cases—107
es 66 us deaths 7	Total	11 deaths —
K. deaths 4		16.6% mortality
is living 0		

Cases	s treated by	early multiple	transfusion
cases	41	Total	12 —

Kernicterus deaths	8	29.5%	morbidity
Non-kernicterus deaths	2		+
Kernicterus living	2		mortality

Even though the criteria were perhaps too conservative in the past, 13 the exchange cases showed better results than those achieved in a series of milder cases in which early interval transfusion was employed. Mollison and Walker<sup>29</sup> carried out a controlled study on 477 infants whose treatment was predetermined by chance. The mortality in the exchange group was 13 per cent as compared to 37 per cent for those treated by early simple transfusions. The incidence of kernicterus was 5 times higher in infants treated by simple transfusion. Of 4 infants who developed kernicterus after exchange, 3 were prematures. Severely affected mature infants with cord hemoglobins below 11 gm. and severely affected prematures with hemoglobins above 11 gm. were the 2 classes showing the greatest improvement as compared to controls. Severely affected prematures with less than 11 gm. of hemoglobin had a high mortality in spite of exchange. Since there is no treatment of the sensitized mother that will prevent kernicterus, with the possible exception of cortisone, and since kernicterus is closely correlated with prematurity, it seems prudent to avoid induction before thirty-eight weeks. Using liberal criteria as an indication for exchange transfusion, Diamond, Allen, and Thomas reported over 200 cases without a single occurrence of kernicterus.30

Exchange transfusion is the only known cure for erythroblastosis and must be done early. According to Diamond and Allen<sup>27</sup> and other leaders, this procedure is done altogether too infrequently. The importance of teamwork between the obstetrician, the pediatrician, and a good laboratory is, of course, mandatory espe-

cially since a greater number of ABO and Hr cases are beginning to be recognized.

Listed below are the indications for performing an exchange transfusion on the infant of parents of incompatible blood types in whom Rh positive and negative, Rh positive subtype, Hr, and A-B-O sensitization has occurred.<sup>31–32</sup>

- A. Babies with positive antihuman globulin (Coombs') test
  - Major maternal indications, singly or in combination
    - a. Prior maternal incompatible transfusions
    - b. History of previous erythroblastotic infants, especially if deaths occurred
    - c. Multiparity, generally speaking the greater multiparity correlating with more severe disease
    - d. Rising or persisting titer of antibodies—blocking, incomplete, albumin, or persisting
  - II. Major fetal indications, especially if accompanied by one or more of the indications in A-I
    - a. Babies with a positive Coombs' test
      - 1. Hemoglobin, 14.5 in cord blood or less after birth
      - 2. Hepatosplenomegaly and/or cutaneous hemorrhages
      - 3. Late neurologic symptoms; twitching, hyperactive reflexes, restlessness, depressed alertness, and poor response to pain
      - 4. Total bilirubin of 15 or 20-mg. per cent in serum
      - 5. High reticulocyte
- B. Babies without positive Coombs' test or elevated fetal bilirubin
  - I. Rising or persistently elevated maternal antibody titer with clinical or serologic indications
  - II. Previous erythroblastotic babies or maternal incompatible blood transfusion with homozygous father
  - III. Combination of B-I or B-II with increasing multiparity
  - IV. B-I or B-II with any of the fetal manifestations as in II
- C. Any premature under 2,500 gm. with positive Coombs' test, if a product of incompatible blood groups, even though fetal indications are lacking.

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The authors wish to express their gratitude to Drs. J. Biering and J. Gurdian of the house staff for assistance in compiling data from the hospital charts.

> CORTICOTROPIN, if administered early, may terminate active rheumatic carditis before the onset of irreversible cardiac damage. When the drug is given intramuscularly every six hours for about seven days in daily doses of 1 to 5 mg. per kilogram of body weight, May G. Wilson, M.D., and associates of Cornell University, New York City, find that the process may be arrested by the second day and patients become ambulatory within one to three weeks after completion of treatment. Chamber enlargement was reversed in 13 of 15 subjects with acute inflammation of short duration, and in 7 of 9 individuals ill for ten to nineteen days. A circulating eosinophil count of 0 to 10 per cubic millimeter was arbitrarily considered a measure of adequate therapy.

> MAY G. WILSON and associates: Effect of short-term administration of corticotropin in active rheumatic carditis. Am. J. Dis. Child. 86:131-146, 1953.

## Objections to Gastroenterostomy for Peptic Ulcer Disease of Childhood

ANGUS L. CAMERON, M.D.

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Peptic ulcer disease during infancy and child-hood up to 16 years of age has received more attention during the last few years than ever before. Although still an uncommon affliction, case reports in the current literature have become much more numerous than heretofore. No doubt, greater alertness on the part of clinicians and roentgenologists for its occurrence in the younger age groups largely accounts for this fact.

While the literature on this subject has become more abundant, it is often quite confusing since a single article includes all types of peptic ulcers found in infants and children, whether acute or chronic and whether found in the esophagus, stomach, duodenum, or elsewhere. Even Curling ulcers and others of an acute variety, which occur secondary to central nervous system involvements are tabulated and discussed along with the rest, including the chronic variety usually seen in the stomach and duodenum of adults. A presentation of this kind, which fails to reveal clearly at all times what kind of a peptic ulcer is under consideration, leaves much to be desired.

A remedy for all this can be found in most of the current literature on peptic ulcer disease in adults in which contributions are not allinclusive, but are limited to clearly defined phases of the subject.

phases of the subject.

Only chronic duodenal ulcers of childhood requiring operations of election for obstruction, bleeding, and failure to respond satisfactorily to accurate medical management are considered in this paper. The subject matter is limited still further to a consideration primarily of the kind of surgical procedures which should be employed in such cases. My interest in this matter was stimulated a little more than two years ago when confronted with the necessity of operating

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upon a 12-year-old girl for chronic duodenal ulcer disease which had been present for two years. Partial obstruction was present at the ulcer site where a rather large inflammatory mass was found which involved not only the proximal duodenum but also the pylorus and the hepatoduodenal ligament. Adhesions between this mass and neighboring structures, including the gall-bladder and the pancreas, were dense and vascular.

In deciding what kind of an operation to employ for this situation, I felt that extensive gastric resection was desirable for the same reasons that it has been found desirable for ulcers of this kind in adults.

Ladd and Gross<sup>2,3</sup> favor gastroenterostomy for chronic duodenal ulcer of childhood and have employed it twice in children. For reasons not stated, except for the declaration that it is unnecessary, they are opposed to any type of resection in the young, although conceding that it has a definite place in the treatment of some adult cases. In practice, most of the small number of surgeons, who until recently reported such cases, agreed with this point of view.

None of this group, however, has emphasized the danger of stomal or jejunal ulcer complicating gastroenterostomy in children with this affliction. A careful search of the literature reveals the need for such emphasis. "Careful" is used advisedly in this connection for the pertinent facts which concern us here are often unrevealed by the titles of the articles which contain them.

When this is true, a report of a stomal or jejunal ulcer complicating gastroenterostomy in a child is likely to remain lost in the literature. Some authors, who have reported cases, have contributed to the false belief that their observations are unique through their failure to search the literature carefully for similar case reports.

In my case report, published in 1953, I said that "while it cannot be denied that gastroenterostomy, as the most favored surgical treatment in these cases, has proved to be satisfactory in most instances in which postoperative results have been noted over a period of years, it should be emphasized that the same serious complication of stomal or jejunal uleer can and does occur after its employment in children just as it does in adults, and there is no good reason to assume that it would not."

This lesson was learned as long as 50 years ago when gastroenterostomy was first being performed for congenital pyloric stenosis. Tiegel<sup>4</sup> reported the case of a 2-month-old baby upon whom an anterior gastroenterostomy was performed and who died three months later from profuse gastrointestinal hemorrhage. At autopsy 2 jejunal ulcers were found, 1 in the afferent and the other in the efferent limb of the anastomosis.

Fisk<sup>5</sup> read a paper two years later before the New York Surgical Society on hypertrophic stenosis in infants in which he stated that "Mikulicz successfully operated upon a patient by anterior gastrocnterostomy, who died two months later as a result of a diffuse intestinal hemorrhage due to peptic ulcers in the walls of the duodenum opposite the anastomosis." He probably meant the jejunum instead of the duodenum.

Kausch,<sup>6</sup> according to Szilagyi and McGraw,<sup>7</sup> in 1912 reported the occurrence of a marginal ulcer in a 9-month-old baby after gastroenter-ostomy for infantile pyloric stenosis. Referring to this case in 1943, Szilagyi and McGraw made the following observation: "It is of more than passing interest to record that among the fairly large number of gastroenterostomies in infants only one reported case of marginal ulcer has been found."

In 1918 Michaelsson<sup>8</sup> operated upon a 10-yearold girl for high-grade pyloric stenosis due to an ulcer of the pylorus. Stomach symptoms had been present for three years. A posterior gastroenterostomy was performed with satisfactory results for only six months. At the end of this time, she began to have pain after meals. Roentgen examination on November 17, 1922, revealed a stomal ulcer. The next day this finding was verified at operation, an ulcer being found in the distal jejunal limb of the anastomosis. Among other things a partial gastric resection was performed. Michaelsson reports seeing another jejunal ulcer in an 18-year-old girl who had had ulcer symptoms since she was 14 years old and who had been operated upon elsewhere. In 1931, Strode<sup>9</sup> performed a posterior no-loop gastroenterostomy on a 10-year-old boy for a duodenal ulcer which was on the point of perforating. About nine months later, at a second operation, a large ulcer was found in the jejunum

just to the left of the stoma. It penetrated into the transverse mesocolon. At this time a subtotal gastric resection was performed with good results.

Fowler and Hanson,<sup>10</sup> in 1940, reported the occurrence of a gastrojcjunal ulcer in a 24-year-old man who had had a posterior gastroenterostomy for pyloric stenosis in 1914 when 6 weeks old. His ulcer symptoms, pain and bleeding, began when he was 18 years old. At operation in 1938, a large ulcer in the jejunum proximal to the stoma was found. Fowler and Hanson stated too that "in a limited review of the literature we have been unable to find another reported case of a gastrojejunal ulcer forming in a gastroenterostomy stoma for pyloric stenosis."

Walters<sup>11,12</sup> in 1941 and 1946 reported cases of 5 patients whom he had operated upon years after they had had a gastroenterostomy operation in infancy for congenital pyloric stenosis. All suffered severe gastrointestinal hemorrhages from hemorrhagic and ulcerative gastrojejunitis eighteen to thirty years after their initial operation of gastroenterostomy.

Stevens and Boeck<sup>13</sup> in 1944 reported the occurrence of chronic jejunal ulceration found at operation in a 31-year-old man who had had a gastroenterostomy when 6 weeks old for hypertrophic pyloric stenosis. Hemorrhage first occurred at 19 years of age. Thereafter, over a twelve-year period, 8 more such attacks followed at irregular intervals of one month to two and one-half years. Stevens resected the involved segment of jejunum and then performed a pyloroplasty.

Stevens and Boeck also reported the occurrence of gastrojejunal hemorrhage in 2 brothers, 26 and 28 years old, who had had gastroenterostomy performed in infancy for hypertrophic pyloric stenosis. Both began to bleed at the age of 24 years. Less than two years before the report, 1 brother had received roentgen therapy and had not bled again. The younger brother also had roentgen therapy, but had had another episode of bleeding afterwards.

Baker, Pearson, and Berger<sup>14</sup> reported 2 cases of interest here in 1950. The first was a man, aged 30, who had had a gastroenterostomy performed at 8 weeks of age in 1916 for "pyloric stenosis." He had suffered increasing gastric distress for four years prior to examination by the authors. Roentgen study demonstrated no stomal ulcer. At operation in 1946, the retrocolic gastrojejunostomy showed no evidence of ulcer. Since the hypertrophied musculature of the pylorus persisted, a Fredet-Ramstedt operation was

then carried out to relieve the pyloric stenosis. Improvement was prompt and complete and had continued so up to the time of the report.

The second case was that of a 36-year-old man, who in 1912 at the age of 6 weeks, had had a gastroenterostomy "for obstructing tumor of the pylorus." When seen in 1948, he was complaining of "stomach trouble" which he had had since 25 years of age when he had his first episode of hematemesis and melena. Not until 1947, ten years later, did he have more trouble, and then he had another severe hemorrhage. Up to the time of examination by the authors, 6 subsequent episodes of bleeding occurred. X-ray films failed to reveal stomal ulceration, but 2 small gastric ulcers adjacent to the stoma were seen upon gastroscopic examination. At operation a healed undermined mucosal ledge, possibly a healed ulceration, was found adjacent to the stoma. The gastroenterostomy was taken down and the patency of the incompletely obstructed pylorus was provided for by dividing an encircling band of tissue. Hypertrophy of the pylorus was not present.

Armitage and Rhind<sup>15</sup> reported the case of a perforated jejunal ulcer in a 40-year-old woman who had had a posterior gastroenterostomy performed in 1909 when about 2 months old for congenital pyloric stenosis. At the time of the emergency operation for perforation in 1950, it was not known that a posterior gastrojejunostomy had been performed in infancy. A perforated ulcer was found at the duodenojejunal flexure. The pyloric canal was found to be greatly thickened as it is in infants with congenital pyloric stenosis. A subtotal gastrectomy was performed. This woman was delicate as a child and did not eat as much as other children. In 1935, about twenty-six years after her gastroenterostomy operation, she had an attack of abdominal pain and vomiting. Roentgen examination at that time showed rapid emptying of the stomach through the normal appearing gastrojejunostomy stoma. Apparently this part of her history was not known at the time of her operation in 1950.

In 1951, Donovan, Knox, and Floyd<sup>16</sup> reported 3 more cases of adults operated upon for gastro-intestinal symptoms, who had had gastroenter-ostomy performed in infancy for congenital pyloric stenosis. The first patient was a 29-year-old man who was asymptomatic for twenty-seven years after his gastroenterostomy. He then developed epigastric pain, anorexia, and occasional vomiting. At operation in 1941, a marginal stomal ulcer was found together with a firm pyloric tumor. Dismantling of the gastrojejunostomy

and a pylorectomy were carried out, followed by a Billroth I type of gastroduodenostomy. Less than one month later, because of retention of gastric content, an anticolic gastrojejunostomy with entero-anastomosis was done. The patient then did well.

The second case was that of a 25-year-old woman who had had a gastroenterostomy performed at the age of 2 days for a "double obstruction of the intestinal tract," one point of which was in the pylorus and the other "high in the small intestine." She remained entirely well until 20 years of age when she had a severe episode of hematemesis and melena. She again noted tarry stools two years later. At operation, in 1941, 3 jejunal diverticula were found and excised. No bleeding point was seen. Because bleeding recurred, she was again operated upon in 1942. The gastrojejunostomy was disconnected and adhesions severed; also a feeding jejunostomy was carried out. Another operation was performed fourteen days later because of jejunal obstruction due to adhesions. The latter were freed and recovery followed.

The third case in this series was that of a 31-year-old man who underwent a posterior gastro-jejunostomy for congenital pyloric stenosis at the age of 21 days. He remained well until the age of 22 when he had an attack of hematemesis and bloody stool. After recovery he remained symptom free for nine years when a second attack occurred with the same symptoms. Roentgen examination revealed evidence suggestive of a marginal ulcer. At operation, which was a partial gastric resection, chronic gastritis and jejunitis were found together with persistence of the hypertrophy of the pyloric musculature. Satisfactory results followed the operation.

## DISCUSSION

These 21 instances of serious postoperative complications in and about gastroenterostomy stomas, which were created in infants and children do not, of course, constitute a complete list of such occurrences. How many cases have been reported and also lost in the literature is unknown, just as the total number of gastroenterostomies performed in this young age group is unknown. Baker and associates stated: "For the period preceding 1912, when the Fredet-Ramstedt procedure was introduced, congenital pyloric stenosis was infrequently recognized and usually treated conservatively because surgery was associated with a prohibitive mortality." Szilagyi and McGraw, quoting Abel, Dufor and Fredet, stated that from 1897 till 1908 gastroenterostomy was employed in these cases only 52 times with a mortality of 59.6 per cent.

Since then, of course, the number of gastroenterostomy operations in infants and children for any cause is actually very small. In view of these facts, the 21 instances of postoperative complications cited here may constitute a much bigger percentage of the total number of cases in this young age group than is realized.

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# SUMMARY AND CONCLUSIONS

Evidence is presented which proves gastroenterostomy unfavorable for illnesses of infancy and childhood and in particular for peptic ulcer. This operation, which has been generally discarded for adults with peptic ulcer disease, should no longer be employed for infants and children suffering from the same affliction, and for the same reason.

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BACTERIAL INFECTION is an important and common cause of asthma in childhood. Such infection frequently complicates asthma from other causes and at times seems to be the sole etiologic factor. Infectional bacterial asthma - Some children have attacks only during and immediately after colds. These patients do not have asthma between colds in winter or with summer colds. In this purely infectional asthma, the lungs are clear; no symptoms appear between attacks or in the summer.

Nasopharyngeal cultures of patients with upper respiratory infections and of normal members of a community taken collectively show different prevalent species at various times. The seasonal variations are most conspicuous. The incidence of pathogens is low in early fall, increases to a zenith in March and April, then declines until late summer.

Asthma from inflammatory action of colds – Asthma may also be caused by the irritative and inflammatory action of epidemic colds without bacterial sensitization. A frank or even latent allergic bronchiolitis is found in such cases. If asthma occurs with colds during the summer, pollen sensitization should be suspected. If patients are sensitive to ragweed, asthma may occur with colds until early winter. If several sensitivities are present, distinction between the two mechanisms of production of asthmatic attacks may be difficult.

Bacterial therapy is unnecessary. Treatment of the underlying allergy is adequate. FRANKLIN A. STEVENS: Acute asthmatic episodes in children caused by upper hacteria during colds, with and without bacterial sensitization. J. Allergy 24:221-226, 1953.

# The Likelihood of Recurrence of Congenital Malformations\*

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IN MINNESOTA this year about 80,000 infants ▲ will be born, almost all of them normal and healthy. However, for some 1,200 Minnesota families the event will be marred by the appearance of a malformed infant. These infants will cause disappointment and often a sense of guilt among the parents who will look to the family physician for an explanation of why their child was malformed. Moreover, they will want to know if future children will be similarly affected. The physician, if he wishes to cover up for ignorance on the subject or if he wishes to ameliorate the situation, can simply say that causation of malformations is poorly understood and that another malformed infant is extremely unlikely. The first explanation would be correct for the most part and the second would be favored by natural odds and the small size of present-day families. Nevertheless, pertinent information is available on these subjects, information that should be of interest and value to physicians and parents alike.

Studies here and abroad have shown that approximately 1 in every 65 newborn infants has a gross malformation. The figures reported have varied considerably, however, both for individual types of anomaly and for all malformations as a group. For obvious reasons, birth certificate data have consistently underestimated the incidence. Thus, a recent report showed only an incidence of 1 in 5,000 for congenital heart disease, which is perhaps a twenty-fold underestimate! Some differences in the reported incidences of various malformations are perhaps due to real biologic differences in the populations studied.

The two subjects – causation and likelihood of recurrence – are closely related, though the

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former unfortunately is too seldom understood. If causation of a particular defect is known, then the likelihood of recurrence, hereafter called "risk figure," can be readily determined. Thus, if a malformation is a clear-cut hereditary trait, the pattern of inheritance can be used in the calculation of risk figures. For example, a dominant hereditary trait such as achondroplasia, if present in one parent, can be expected to occur in 50 per cent of the children. If this trait is absent in the parents, but present in one child, the trait probably arose by mutation in one of the germ cells of the father or mother, and subsequent siblings will not have the trait. If a recessive hereditary trait, such as the infantile type of polycystic renal disease, occurs in one child, it will appear in one of every four siblings born later. This infantile form of polycystic disease is not to be confused with the more frequent adult type which depends upon a dominant gene. Unfortunately, at least for the geneticist, few malformations behave as clear-cut hereditary traits, even though heredity seems to influence the development of many of them. Moreover, some malformations, such as harelip, cleft palate, and clubfoot behave as recessive traits in some families and as dominant traits in others. Therefore, knowledge of the individual family history in utilizing risk figures is important.

If the causation of the malformation can be identified as being due to maternal rubella, radiation, or toxoplasmosis, the risk of recurrence in later siblings appears to be no greater than the general incidence in the population. In any event, increased risk in such cases has not been reported, and at least one worker has pointed to lack of such risk in the case of toxoplasmosis.

As already mentioned, no specific causative factor can be identified in most malformed infants, though such factors as threatened abortion, maternal diabetes, increased maternal age, twin-

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TABLE 1
RISK FIGURES FOR LATER SIBLINGS

	Incidence in population	Risk figure for later siblings
All malformations	1 in 65	1 in 20
Central nervous system malformations (35%)		
Anencephalus	1 in 450 γ	1 in 50 )
Spina bifida	1 in 375 $\$ 1 in 200	1 in 25 $\rangle$ 1 in 22
Hydrocephalus	1 in 550 J	1 in 60 J
Mongolism	1 in 600	1 in 20
Muscular-skeletal malformations (25%)		
Harelip with or without cleft palate	1 in 1000	1 in 7
Cleft palate alone	1 in 2500	1 in 7
Polydactylia	1 in 1200	1 in 2
Syndaetylia	1 in 2000	1 in 2
Clubfoot	1 in 1000	1 in 30
Malformed arms, hands	1 in 5000	-
Achondroplasia	1 in 7000	see text
Congenital hip dislocation	1 in 1500	1 in 20
Cardiovascular malformations (20%)		
All congenital hearts	1 in 200	1 in 50
Patent ductus	1 in 2500	1 in 50
Genitourinary malformations (6%)		
Hypospadias	1 in 1000	1 in 50(?)
Polycystic kidney (infant)	1 in 15000	1 in 4
Gastrointestinal malformations (3%)		
Exomphalos	1 in 4000	less than 1 in 100
Diaphragmatic hernia	1 in 10000	_
Tracheo-esophageal fistula	1 in 6000	less than 1 in 100
Atresia ani	1 in 5000	less than 1 in 100
Multiple malformations (11%)		
Miscellaneous		
Pyloric stenosis	1 in 350	1 in 17

Note: At least for malformations of the central nervous system and the cardiovascular system, the increased risk figure for siblings has been found to involve only defects of the same body system.

ning, and chronic maternal disease have been considered as possibly significant. In such cases, risk figures can be obtained by investigating the late reproductive history of women who have already produced children with a particular defect. The most widely quoted data of this kind are those reported by Murphy, who found that for siblings born after an infant whose gross malformation led to death, the risk of recurrence was approximately 11 per cent, and the recurrent malformation resembled the first malformation in approximately half of the cases. Later studies by other workers indicate a somewhat lower figure, somewhere around 5 per cent. If two malformed children have been born, the risk for subsequent children appears to be even further increased. In such cases, the mother by "biologic testing" has shown her tendency to produce defectives, and the risk figure then becomes as great as 15 to 25 per cent.

The accompanying table lists the relative frequencies of the several body systems that are involved in malformations, the incidence of the various individual malformations, and the risk figures for late-born siblings. The figures are approximate, and have been assembled after evaluation of many reports too numerous to justify quoting. Again, attention is drawn to the importance of knowing the family history of individual cases, since family information may make possible the formulation of an approximate risk figure. In cases of doubt, or when other knowledge is desired, the physician can benefit through consultation with genetics information centers, or he can refer his patients to such places for additional information. The Dight Institute of Human Genetics, which is located at the University of Minnesota, is one such group and offers free consultation services on problems of heredity.

# Abnormal Pulmonary Ventilation in the Newborn

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THE PROBLEM of neonatal death is of tremendous importance, not only in mere years for the individual, but in the measure of his contribution to the life of his race.

Although during the last forty years, infant mortality rates have dropped about 80 per cent, a high neonatal mortality still prevails. For example, in 1950 in New York City, 60 per cent of the infant deaths occurred during the first month of life, 83 per cent of these during the first week. Of these 83 per cent, one-half died during the first twenty-four hours of life. In Chicago in 1950, 75.5 per cent of infant deaths occurred during the first month of life, 87.7 per cent of these during the first week, and 56.5 per cent in the first twenty-four hours of life.

Although only 8 per cent of all the births in 1950 were premature infants, 71 per cent of all neonatal deaths were in premature infants.

The neonatal premature mortality rate during 1950 was 169.3 per thousand live premature births, while the neonatal full-term mortality was 6.1 per thousand full-term births.

In order to determine why so many babies, both premature and full term, die during the first few hours of life, actual causes of these deaths must be determined, and then, if possible, attack those which are most amenable to attack.

TABLE 1

Percentage of those dying dur- ing first month of life	Percentage of those dying dur- ing first day of life		
43.7	54.3		
16.6	18.2		
15.8	12.0		
13.4	6.2		
5.3	3.9		
3.8	. 4.7		
1.4	0.7		
	those dying during first month of life  43.7 16.6 15.8 13.4 5.3 3.8		

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The causes listed in table 1 are taken from the pamphlet *Progress in the Prevention of Needless Neonatal Deaths* published by the Chicago Board of Health in 1951.

I am sure that these figures are representative of other sections of the country besides Chicago.

Table 1 shows that abnormal pulmonary ventilation causes the greatest number of infant deaths in the first day of life and in the first month of life. It is with these children, I believe, that the most striking changes in the neonatal mortality rate can be made.

This category was devised by Edith L. Potter to include all infants who showed no specific pathologic lesions outside the lungs on postmortem examination, and those whose deaths could be accounted for only on the basis of inadequate functioning of the lungs. In some cases, the inadequate function appeared to have been due to depression of the respiratory center. In some instances, immaturity of the lungs was the cause. In many cases, it was due to the condition often called hyaline or pulmonary hyaline-like membrane with resorption atelectasis. Occasionally, no cause could be determined other than varying degrees of atelectasis.

Among premature infants, the estimated mortality rate from abnormal pulmonary ventilation is 70.3 per thousand premature births, while the rate is 1.8 per thousand in full-term infants.

Among the various conditions grouped together under the title of abnormal pulmonary ventilation, we are especially interested in pulmonary hyaline membrane disease. This condition is found in association with a characteristic clinical picture. The majority of infants with this condition breathe normally for a few minutes to several hours after birth. Soon, however, extreme respiratory distress is developed, characterized by severe sternal and costal retraction and death often occurs within the first twelve to forty-eight hours.

Postmortem examination reveals that the lungs are extremely congested and appear to be grossly airless. This condition is a secondary or resorption atelectasis. It is usually associated with a pink staining hyaline-like membrane which surrounds or lines the few terminal air spaces remaining open, and appears to be an active block to the effective oxygenation of the blood within the pulmonary capillaries. When the alveoli are blocked, the air in them is reabsorbed and atelectasis results.

Several theories have been suggested for the cause of hyaline membrane formation.

Probably the leading theory is that these membranes are formed as a result of inhalation of amniotic fluid, concentration of protein from the amniotic fluid and compression of this concentrated protein about the periphery of the respiratory bronchioles, alveolar ducts, and alveoli. This theory is difficult to prove since a hyaline membrane has not been produced by injecting amniotic fluid into the trachea of a live animal or a newborn human being.

Some people feel that the protein producing the hyaline membrane is derived from the blood. This theory is based on the preponderance of hyaline membranes in prematures, the recognized presence of increased capillary fragility in premature infants, and the occurrence of hyaline membranes in older children and adults in whom vascular damage has been produced in

the lungs by a variety of means.

The third and, to me, most logical cause of pulmonary hyaline membrane is some disturbance of the vagus. Pulmonary hyaline membrane has been produced experimentally by bilateral vagotomy. The newborn can be shown to be an organism with a very poor vagal mechanism, witness the very rapid heart rate of the newborn, the unstable metabolic rate, and the diminished cough reflex. The activity of the thorax and the diaphragm are definitely modified after birth. The vagus has a great deal to do with activity of the diaphragm. Immediately after birth, the predominant tendency is for the chest and abdomen to move in a synchronous manner. In a relatively short period of time, however, the abdomen may expand while the chest contracts and within a short time the chest may contribute little to the infant's breathing. The mature type of breathing in a newborn is that type in which the diaphragm assumes the major role and the thorax plays a relatively small part. The immature type of breathing is that in which the chest does a fair portion of the work as compared to the diaphragm.

The prevention and treatment of abnormal pulmonary ventilation consists of adhering to a few recognized principles of good medicine.

1. Early diagnosis. As this condition often

occurs after an unusual delivery such as cesarean section, multiple births, premature births, placenta previa, and so forth, infants in these situations should be watched very closely the first few minutes and hours after delivery. Sidney Gelles believes that every child born by cesarcan section should be placed in an atmosphere of increased oxygen and humidity during the first twenty-four hours after delivery. I observe the child's method of respiration after a normal delivery, which is a simple procedure to follow. If the child is using the thoracic muscles of respiration more than the diaphragm in the first few hours, he can be placed in an environment of oxygen and increased humidity, and chemotherapy can be started rather than to wait twelve, eighteen, or twenty-four hours, for by then the child may be in real trouble.

2. Drain the upper respiratory tract. Using gentle suction immediately after delivery, drain the infant's upper respiratory tract as dry as possible. Bronchoscopy and laryngoscopy should be avoided. These procedures are of doubtful value, unless employed by a physician skilled in their use.

3. Aspirate the stomach. When large amounts of fluid pour out of an infant delivered by cesarean section, quite conceivably a great deal of the stomach contents might be aspirated into the lungs.

4. Maintenance in an atmosphere of oxygen and high humidity. Probably the most important factors involved in the treatment of abnormal pulmonary ventilation are early use of oxygen and humidity. This can be done by the use of any standard incubator-type box. The first six, eight, or twelve hours are of the greatest importance. The disease probably will be irreversible if twenty-four hours pass before resorting to humidity and oxygen. Water is probably all right here for maintenance of increased humidity. But, if available, Alevaire should be used.

5. Chemotherapy. Since many of these infants die from some secondary infection, they should all receive some antibiotic.

6. Avoid feeding. Infants with hyaline membrane regurgitate easily and suck poorly. An infant with abnormal pulmonary ventilation should never be given anything by mouth, including chemotherapy. If the respiratory distress lasts for a few days, fluids can be kept up indefinitely with cut-downs and judicious use of subcutaneous injections. I have kept a premature with abnormal pulmonary ventilation, in whom we finally resorted to a thoracotomy, alive in an airlock for one month with the use of parenteral

(Continued on page 209)

# Urinary Tract Infections in a General Pediatric Practice

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THE PURPOSE of this paper is to present and discuss experience with 33 cases of urinary tract infection seen in the pediatric department of the St. Louis Park Medical Center over the past thirty-two months. All patients have had bacteriologic diagnoses and have been followed for periods of time varying from a few weeks to more than two and one-half years. In most instances bacteriologic follow-up examinations have been possible. The majority of children were seen, diagnosed, and treated as outpatients; 11 were hospital patients, but, of these, 6 were in for reasons unrelated to the urinary tract infection, leaving only 5 cases serious enough to demand hospital care.

The material will be presented in sections which deal with symptomatology, hemograms, urinalyses, roentgenograms, bacteriology, and treatment.

# SYMPTOMATOLOGY

That infections of the urinary tract in children may present themselves in a variety of ways has long been known. The small group of cases under discussion here demonstrates 13 different presenting complaints.

Fever of undetermined origin was the most common initial finding. This was the major presenting complaint in 22 patients. It is interesting that this was true for children ranging in age from 1 week to 12 years. The fevers ranged from 100.1 to 105° F. (rectally).

Dysuria, a common adult complaint which is assumed to occur seldom in children, was a major presenting symptom in 7 youngsters. Most of these patients were 4 and 5 years of age, but 1 was 2½ and another 11 years old.

Frequency, another complaint generally considered unusual in children with urinary tract

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infections was an initial symptom in 6 of the patients studied. These also varied in age, the youngest being 4 and the oldest 11 years old. Generally speaking, dysuria did not accompany frequency.

Severe diarrhea occurred as the major presenting complaint in 5 of the 33 cases. Of these 5 children, 4 had concomitant dehydration and electrolyte imbalance requiring continuous intravenous fluids. Treatment specific for the organism infecting the urinary tract caused dramatic cessation of the symptoms.

Failure to gain weight as expected occurred in 3 children. The first patient was a premature who suffered excessive initial weight loss and failed to gain weight until she received specific treatment to combat the bacteria infecting her urinary tract. The second patient in this group did not gain weight in the fifth month of life; this child was also irritable and anorexic. Until the time of examination, the mother did not realize that the baby was either ill or feverish. This patient responded dramatically to specific treatment. The third child in this group was a 5-year-old girl who presented a real deficit in weight gain. Treatment was ineffective in this case, and not until this child enjoyed a spontaneous recovery several months later did she experience a normal weight gain.

Irritability was spontaneously mentioned as a problem in 3 cases. Our impression is that a urinary tract infection, like an upper respiratory tract infection, tends to make a youngster irritable rather than lethargic, as in the case of pneumonia.

Anorexia was a presenting complaint in 3 cases. It was the chief symptom in 2 children, 1 of whom was 5 months old and the other 5 years. Physical findings in both these children were minimal. The baby was normal except for a rectal temperature of 100.1° F., and the 5-yearold's physical examination was normal except for a deficit in the expected weight gain.

Nocturnal enuresis occurred in 3 girls aged 4, 4½, and 5 years. Each of these children had had nocturnal bladder control for more than a year prior to this experience. Careful psychologic review in each case revealed no likely psychogenic cause for the enuresis. Specific treatment of the infecting bacteria resulted in dramatic termination of the symptom.

Abdominal pain was the chief symptom of 3 patients. There was no cause to suspect a surgical abdomen, and the tenderness disappeared with specific treatment for the urinary tract

infection.

Cord bladder was present in 2 patients studied. Since practically all such patients eventually develop urinary tract infections, they should be repeatedly evaluated and kept on prophylactic medication. These 2 patients initially presented with incontinence and dribbling of urine as well as atonic rectal sphincters. Fever developed in 1 child while on prophylactic medication. Therapy was changed after identification of the specific infectious agent, and the child became asymptomatic. Both of these patients have been well controlled with prophylactic therapy, but their urine cultures remain positive. A third patient with cord bladder, associated with multiple congenital defects, was not included in this study because urinary tract infection was absent during the thirty months after a cord bladder was first discovered. He has been receiving daily 7½ gr. of prophylactic sulfadiazine.

Pyuria accompanied by no symptoms was an incidental finding in a 1-month-old male infant and in a 3-month-old female undergoing preopcrative hernia repair workups. Both infants were found to have positive cultures, and the urine was easily sterilized.

Gross hematuria was the presenting complaint in 1 case.

A convulsive state was the chief symptom presented by 1 patient. Somewhat earlier she had been vomiting, and within three days developed progressive listlessness, and finally a grand mal seizure. Vomiting had not been severe, and no pronounced electrolyte disturbance was present. Seizures were controlled only after a great deal of intravenous sodium amytal. The patient remained desperately ill with coma and high fever until the day after admission, when urine culture revealed that a urinary tract infection was present. Specific treatment of this infection resulted in prompt recovery.

# HEMOGRAMS AND URINALYSES

White blood cell counts were done on the peripheral blood of 18 patients, 10 of whom had total counts numbering less than 12,000. All but 1 of these patients had differential cell counts

done; about one-half of these were normal while one-half showed a relative or absolute neutrophilia. The peripheral blood findings are so variable that a urinary tract infection is not usually suspected if there is no other reason for doing so.

Completely normal urines were found in 9 of the 25 patients who had urinalyses. Of these 25 patients, 14 had an abnormal number of white blood cells in the urine, and 7 had an abnormal number of red blood cells in the urine; 1 had gross hematuria.

### ROENTGEN EXAMINATION

Urologic roentgen examination in this group of cases was considered necessary in: (1) all males with urinary tract infection, and (2) all females with history of more than 1 urinary tract infection, or urinary tract infection lasting over one month, as determined by persistent positive urine cultures.

On the basis of these indications, 6 patients had intravenous urography. Only 1 of these was a male, and his findings were normal. A urinary tract infection was present in 1 patient, which had persisted for more than a month. Her intravenous urogram was normal. The 4 remaining patients had histories of repeated urinary tract infections. Intravenous urograms indicated that 2 of these were normal, 1 had bilateral megaloureters, and 1 had bilateral double ureters.

# BACTERIOLOGY

Identifying the bacteria in urine collected by a sterile method is essential to the diagnosis of urinary tract infection. Bacteria may be recognized in the urine either by means of a gram stain of the urine sediment or by means of a culture of the urine. The culture is considered the more sensitive of the 2 methods. All of the 33 cases in this study had positive urine cultures. The infecting bacteria were of the enteric group in 32 cases, and the remaining case had a coagulase positive Micrococcus (table 1).

Urine specimens for bacteriologic study and cultures were secured by the methods suggested

by Helmholz.<sup>1</sup>

In the female the area in the vicinity of the urethra is washed with aqueous zephiran. A Campbell 8 F metal female catheter is introduced into the meatus without touching any other part of the vulva and is gently introduced into the bladder. The first few drops of urine are then discarded and the specimen is taken in a sterile test tube. It is helpful to remember that the urethra passes posterior to the pubis. Consequently the catheter is first directed pos-

TABLE 1 SHOWS ORGANISM AND TREATMENT

Infecting bacteria	Number	Treatment	Number	Success	Failure
Escherichia coli	11	Tetracycline group Sulfadiazine	9 2	9 1	$0\\1^{1}$
Aerobacter aerogenes	6	Tetracycline group Chloramphenicol Sulfadiazine	4 1 1	$\begin{array}{c} 4 \\ 1 \\ 0 \end{array}$	$0\\0\\1^1$
Proteus group	5	Tetracycline group Sulfadiazine	3 2	3 1	$\frac{0}{1^2}$
Paracolon bacillus	4	Tetracycline group Sulfadiazine	3 1	3 0	() 1 <sup>3</sup>
Pseudomonas	2	Chloramphenicol	2	1	11
Escherichia coli and Aerobacter	2	Sulfadiazine Aureomycin	1 1	1 1	0
Multiple enteric bacteria	2	Multiple agents	2	0	$2^5$
Staphylococcus aureus	1	Erythromycin	1	1	0

<sup>1</sup>Subsequently successfully treated with one of the tetracycline group of drugs.

\*Tetracycline group and sulfadiazine were likewise ineffective; this case has been followed less than one month.

Cord bladder and fecal incontinence.

teriorly under the pubis and then upward into the bladder.

In infant boys the foreskin is retracted and the same method of cleansing used; the boy is catheterized with an 8 F rubber catheter.

In the case of older boys, after the foreskin has been retracted and the glans washed with Zephiran, a small amount of urine is allowed to wash out the urethra before the specimen is collected in a sterile test tube.

Catheterization is dangerous only in cases of stasis of urine in the bladder, which occurs in cord bladders and urethral obstructions. In these cases the technic employed for catheterization must be especially meticulous, so that an infection is not introduced at the time the procedure is done. Normally functioning bladders are believed capable of ridding themselves of the few bacteria that will be introduced with the catheter. Inasmuch as Helmholz² has found bacteria as far as 5 cm. up the normal male urethra, it seems doubtful that an absolutely sterile catheterization can be achieved.

Culturing urine is a simple bacteriologic technic. Sterile urine is spun at 2,500 rpm for five minutes. A loopful of the sediment is streaked on an eosin methylene blue agar plate, and another loopful is introduced into a thioglycollate broth tube. Normal urine is sterile, and there should be no growth on either media. In case of urinary tract infection, both media will be infected with many colonies. Gram positive cocci are recultured from the broth onto blood agar plates, where they become easily recog-

nizable. Gram negative rods can be identified from the eosin methylene blue plate. Small hospital laboratories should have no trouble with this technic. The rare infections such as tuberculosis (causing pyuria), and actinomycosis will not be detected by the method described. Both require special culture media, although actinomycosis can often be detected in a simple gram stain of a urine sediment smear.

# TREATMENT

The keynote of treatment can be summarized in a quotation from Sir Arthur Fleming, "It is not a disease you are combating; it is a microbe."

The enteric bacteria which were the pathogens in 32 of the 33 cases in this group were most consistently affected by the tetracycline group of drugs; for that reason the initial treatment in most of these cases was 1 of the tetracyclines in a dose of 10 mg. per pound every twenty-four hours. If the drug proved effective, a dramatic clinical response was experienced in twenty-four to forty-eight hours and the urine became sterile in forty-eight to seventy-two hours. Urine cultures done seventy-two to ninety-six hours after treatment was commenced served as in vivo sensitivity tests of the bacteria involved to the drug employed. A second follow-up urine culture was done seven to fourteen days after treatment was terminated, to be sure that the urine remained sterile. If both these cultures were sterile, therapy was considered successful. If either of these cultures was positive, therapy was considered a failure and subsequent treatment

<sup>&</sup>lt;sup>2</sup>Tetracycline group, chloramphenicol, calcium mandelate, and ammonium chloride were also ineffective; subsequent spontaneous cure. 
<sup>3</sup>Subsequently successfully treated with Furadantin.

was determined by in vitro antibiotic sensitivity tests. (See table for results of treatment in individual cases.)

Of the 33 cases, 4 were persistent treatment failures. Of these, 2 had cord bladders with mixed infections; 1 had a Pseudomonas organism which was very resistant to all antibiotics (this patient has been followed for less than a month); the fourth patient had a very resistant Proteus infection. This patient spontaneously sterilized her own urine after several months of infection and unsuccessful treatment. Only 1 patient, aside from the 4 with congenital tract anomalies, had a recurrence of urinary tract infection after successful treatment.

The drugs were prescribed in the following doses: tetracycline group, chloramphenicol and Erythromycin 10 mg. per pound every twenty-four hours divided in 4 doses; sulfadiazine 1 gr. per pound every twenty-four hours divided in 4 doses; Furadantin 3.5 mg. per pound every twenty-four hours divided in 4 doses.

The symptoms of pain, fever, frequency, dysuria, and so forth were not treatment problems because they were so rapidly eliminated by the control of the infection with antibiotics. It is outside the scope of this paper to discuss the methods of fluid and electrolyte therapy and the control of convulsive states, used in the few seriously ill patients in this group.

## REFERENCES

1. Helmholz, Henry F., Sr.: Acute urinary infections, vol. 3, chapter 27, page 6 of *Brennemann's Practice of Pediatrics*, Irvine McQuarrie.

### SUMMARY

A group of 33 cases of urinary tract infection studied by the pediatric department of the St. Louis Park Medical Center has been presented, with special emphasis placed on the following aspects:

1. Symptomatology. The major presenting complaints were extremely variable, often unrelated to the urinary tract itself. Several children were seriously ill with diarrhea, and 1 with a convulsive state. Both conditions were proved secondary to the urinary tract infection.

2. Hemograms and urinalyses. About half the patients had normal hemograms. The peripheral blood findings were so variable that they were not helpful in differential diagnosis. Bacteriuria without pyuria was a common finding.

3. Roentgen examination. Indications for urologic roentgenograms have been set forth. Of the 6 cases in which intravenous urography was done, 4 proved normal, and 2 presented anatomic anomalies of the ureters.

4. Bacteriologic findings. The importance of urine culture in the identification of the specific infecting agent has been stressed, and adequate methods of obtaining and culturing urine specimens have been presented.

5. Treatment. The most effective types of treatment have been discussed, with emphasis again placed on the importance of identifying the specific organism to be attacked.

 HELMHOLZ, HENRY F., SR.: Determination of the bacterial content of the urethra. J. Urol. 64:158, 1950.

Terramycin usually effectively eradicates pinworm infestation in children. When the drug as the base or hydrochloride is administered in the daily dosage of 10 mg. per pound of body weight given in three equal doses for seven days, Thomas S. Bumbalo, M.D., and associates of the University of Buffalo and Edward J. Meyer, Memorial Hospital, Buffalo, report satisfactory results in 84 per cent of patients. Hygienic measures are also prescribed. In similar groups of 40 subjects each, 3 other oxyuricides showed the following cure rates, as determined by the scotch tape swab method: Egressin (thymolnisoamylcarbamate), 52 per cent; Diphenan (parabenzylphenylcarbamate), 30 per cent; and methylrosaniline (gentian violet enseal tablets), 82 per cent.

Thomas S. Bumbalo and associates, and Edward J. Meyer: Am. J. Dis. Child. 86:592-600, 1953.

# Management of the Enuretic Child

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THE CHILD who is couretic has presented a difficult problem to parents and physicians alike for many centuries. No effective means of treatment has yet been found for enuresis, or bedwetting, as the nocturnal and most common form is often referred to. However, despite the confusion regarding this problem, and the multitude of contradictory studies reported, a gradual philosophy of treatment seems to be developing.

In frequency, enuresis is very common, perhaps second only to feeding problems in childhood. The condition occurs about twice as often in boys as in girls. Approximately 1 child in 20 fails to have control of urination by the age of 5. This incidence, however, is higher in groups of emotionally disturbed children where even 10 to 12 per cent of the group may be actively enuretic. This is the only common symptom that children are almost always ashamed of and that parents are frequently punitive about. An average child who has been exposed to adequate toilet training by interested parents may be expected to keep his clothes and bed dry by 3 years of age. A child should not be considered enuretic, then, until after the age of 3 years.

In our experience at the Child Psychiatry Division, University of Minnesota Hospitals, enuresis is seldom a primary complaint of children referred for study. More often the finding is incidental in those children who present severe behavior and emotional disturbances. It is not uncommonly encountered in general or pediatric practice, however. At the Child Psychiatric Clinic at Johns Hopkins Hospital 26 per cent of the children referred came with enuresis as a major difficulty.<sup>2</sup> Since nearly two-thirds of these children were of borderline intelligence or less, this high proportion may reflect a basic inability to comprehend toilet training.

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# HISTORICAL REVIEW

As long as 2,000 years ago, Pliny, reporting in his *Natural History*, the most common folk remedy of that time, said, "The incontinence of urine in infants is checked by giving boiled mice in their food." Suggestions were also made that the child wear a clean dress at baptism and that the godparents keep their money in their pockets. Among other remedies of that time were the administration of woodlice and the urine of spayed swine.

In the 1,500 years that followed Pliny's report, the treatment of bedwetting had progressed to prescribing the ground flesh of hedgehog, pulverized bladder of a young sow, or application of a perforated lead plate to the back.<sup>4</sup>

A review of recent methods of treatment suggested includes various drugs such as ephedrine, Benzedrine, Dexedrine, sulfonamides, quinine, calcium, atropine, scopolamine, vitamin B, bromides, laxatives, phenobarbital, endocrine preparations, thyroid, methyltestosterone, and chorionic gonadotropin. Surgical and mechanical treatments include use of a penis clamp, catheterization, cystoscopy, bladder irrigation, circumcision, tonsillectomy and adenoidectomy, fulgeration of the verumontanum, and electric current. The value of having the child sleep on a spool is still mentioned. Acidifying alkaline urine, alkalizing acid urine, hypnotism, and varieties of psychotherapy are also mentioned. Methylene blue has been suggested but this, without being particularly effective, makes the sheets considerably harder to launder. Note that almost all of these methods are directed at the bedwetting rather than at the child who is enuretic.

### ETIOLOGY

When enuresis exists after the age of 3 or 4 years, it may be considered symptomatic of faulty toilet training, anatomic, inflammatory, medical or neuropathologic disorders, emotional disturbances, or any combination of these factors. Many conditions have been suggested as the actual or predisposing cause of enuresis.

None, however, have been substantiated by thorough and repeated study. Included are irritations of the genitourinary tract due to phimosis, balanitis, eezema, pruritus, pinworms, cystitis, pyclitis, and nephritis. Winsbury-White<sup>5</sup> reported that over half the females with enuresis they studied had vulvitis, and the majority of the male enuretic patients appeared to have some stenosis of the urethra. Nash<sup>6</sup> believes that adhesions around the corona may lead to enuresis. For this condition and phimosis, as a cause of enuresis, circumeision has been recommended as treatment.

The depth of sleep has been thought to be an outstanding etiologic factor. A hundred years ago Trousseau<sup>7</sup> observed that enuretic children slept very soundly. This is one theory that the use of Benzedrine and Dexedrine is based on.<sup>8</sup> The proposal has also been made<sup>9,10</sup> that the effectiveness of Benzedrine is due to some action on the bladder musculature or that the drug may reduce the overactivity or anxiety which exists in some enuretic children.<sup>11</sup> Courtin observed that enuretic children did not appear to sleep more soundly on the average than nonenuretics, and it is commonly observed that a person who has control of bladder function at night does not wet the bed when sleeping under sedation.

A higher incidence of enuresis has been noted in children with delayed bone age, which is relieved by methyltestosterone linguettes. A recent study<sup>12</sup> of 100 severe enuretics without apparent organie disease, ranging from 5 to 16 years of age, showed that 51 per cent had abnormal electroencephalograms, 23 per cent borderline records, and only 26 per cent normal. Nutritional factors, thiamine deficiency, the concentration and composition of the urine, hypertrophied tonsils and adenoids, and endocrine disorders have all been blamed. Enuresis has been considered an epileptic equivalent. It may represent incontinence in unrecognized cases of epilepsy. Spina bifida is thought by some to play an important role, but while enuresis is often present in children with spina bifida, Kanner reports 1.5 per cent of enuretic children were found to have spina bifida.

Flagg<sup>13</sup> reports 2 cases of enuresis with pathology, 1 with congenital cystic disease of the prostate, and another with a hydronephrotic kidney pulling the bladder out of position. He states that the thorough investigation of enuresis, from a urologic viewpoint, is bound to be discouraging because the vast majority of cases show no demonstrable disease and must be considered

true psychogenic enuresis. No doubt most of the conditions listed previously may, in individual cases, lead to urinary incontinence or enuresis. When such a condition does exist, it would be a grave medical error to treat the enuresis as the result of inadequate habit training or as a symptom of emotional conflict. It is generally agreed, however, that less than 5 per cent of enuretic children show medical or organic disease.

Frary<sup>14</sup> believed that enuresis was a specific hereditary trait. While more than one member of a family often is enuretic or has a history of enuresis, this represents familial patterns and attitudes toward the problem rather than a genetically determined trait. Constitutional predisposition may play a part in some youngsters. Lack of adequate or satisfactory toilet training may be a factor in rural homes or poor socioeconomic areas where toilet facilities in a dark room, down a cold hallway, or in the basement sometimes discourage the child from using the toilet at night.

The importance of parental attitudes in regard to enuretic children has been given considerable attention in recent years. A study<sup>15</sup> of the attitudes of the mothers of 73 children from a kindergarten group suggests that maternal rejection and rigid toilet training attitudes contributed significantly to the 29 children of the group who were enuretic. Enuretic children are often unhappy and present other behavior problems. Of the enuretic youngsters Kanner has studied, 25 per cent were also restless, hyperactive, fidgety children who were easily excited, and 39 per cent showed whining, complaining, moody, grouchy, irritable personality traits.

Considerable investigation has been done by psychoanalytic groups regarding enuresis and the personality dynamics underlying the problem. Katan<sup>16</sup> divides enuretic children into groups who have continued to wet persistently since infancy, and who have achieved toilet training and then later become enuretic. In the latter group, a traumatic experience can often be found directly preceding the reoccurrence of bedwetting. She finds these children respond most favorably to treatment.

In grouping cases according to the nature of the emotional trauma, Katan finds 1 group of children who have been toilet trained by an adult who was close to the child, regress and lose the recently acquired skill when separated from that adult. Treatment in such a case is essentially to replace the loved parent figure. The child will then again gain control of the bladder at night for the sake of the new person to whom he has become attached.

Enuresis appearing after the birth of a sibling generally reflects an element of jealousy. The new baby receives considerable love and attention from the mother, particularly by virtue of its soiling and wetting, in which the older child would like to share. Hence, the older child tries the same method of being infantile and wetting to gain the mother's favor. If the parents understand and try to meet the child's emotional needs for more attention and affection, and especially let the child know that he would be loved a little more if he can gain control again of his wetting, the response is usually good. However, if the parents do not understand what is happening and become punitive, the enuresis may become a part of a growing battle between the child and the parents.

Enuresis occurs in a third group of children when the child discovers the difference between the sexes. These children respond very well to brief psychotherapy. The situation is more serious when the child discovers the sex difference by observing adults rather than another child. Finally, there is a group in which enuresis follows the emotional trauma of surgery. Such cases are usually quite severe and respond slowly to treatment. The psychologic reaction of the child in this latter group often reflects specific anxieties that the youngster has about being injured or of having some part of the body removed as punishment for the bedwetting habit toward which the parents have shown previous anger or hostility. This is particularly so when circumcision or cystoscopy are performed, focusing on the very organ which has been responsible for the bedwetting.

The age of the child when the emotional trauma occurs is very important. Also involved is the adequacy of preparation for surgery and how it is performed, that is, whether the child sees a great deal of blood, frightening, strange surgical instruments, and so forth. In all cases of enuresis, Katan finds present the fantasy that the genitals are damaged like a broken water faucet and cannot retain urine.

Considerable attention has been given to the sexual connotation of enuresis. We observe that children often associate urination with impregnation, and enuresis may accompany fantasies during sleep that would be repressed during the conscious waking hours. Also, in some neurotic individuals, urinary sensations replace direct sexual feelings. Interesting are the dreams that are reported by many enuretic patients – dreams of

being alone in a forest, at the beach, in a swimming pool, or on the toilet - places where urination is permitted. The child seems to receive a stimulus from the filled bladder, but through the dream gets tacit permission to void in bed, thus avoiding the discomfort of awakening and actually going to the toilet. The enjoyment that the young child experiences from being wet and warm is familiar to all of us, as is the pleasure young children often get from holding their urine until the stream has sufficient volume to produce a pleasurable sensation in the urethral mucosa. Often enuresis, even that which has not responded to treatment, stops spontaneously at puberty. An explanation offered is that in early adolescence genital sexual life begins, replacing the wetting as gratification. Also, with the onset of adolescence, more open and direct defiance and hostility toward parents and authoritative figures generally appear. This release may remove the need for enuresis as an expression of hostility. Experience in the armed forces and at examination centers during the last decade indicates that more cnuresis persists into adulthood than was previously realized.

### TREATMENT

It is certainly not unusual to find that bedwetting stops after cystoscopy, circumcision, or tonsillectomy, as well as after more direct punishment for the behavior, or simple rewards. Sometimes just a visit to the doctor or merely making an appointment with the physician may lead to the disappearance of the symptom.

In the hands of a limited number of people, practically every method of treatment for enuresis proves successful, while others who apply the same procedures fail to gain as good results. This fact suggests the possibility that effectiveness of any given treatment is more a function of subtle psychologic influence rather than the specific treatment used.

A possible source of failure of treatment is to consider enuresis as the focus of the treatment and to attribute it to a single cause, rather than to consider it a result of many factors including the child's attitudes and his relationships with his parents and the family group.

Braithwaite<sup>17</sup> reports a study in which he used a variety of methods, each treatment being used on the remainder of a group which had not responded to previous treatment. He found successively that simple reward and bedtime voiding, drugs, bladder distention, and hypnosis, each resulted in cessation of enuresis in approximately 20 to 30 per cent of the group

receiving that treatment. Braithwaite also notes that in England enurcies is easy to cure in the summer, but no cure should be considered definite until a winter has passed. This may reflect the importance of physical discomfort, emphasized by lack of central heating in that country.

Hypnosis has been suggested as a simple and direct method of treatment by suggestion. This frequently is effective but there are two possible objections to this method. As found by Freud and others, the symptom tends to reoccur in time. Also, hypnosis of children often creates a strongly dependent relationship on the hypnotist which then may become quite difficult to handle. Hypnosis was reported to be enjoyed so much by 1 child that he continued to wet in order to be repeatedly hypnotized.<sup>17</sup>

Of particular interest again recently, is treatment by conditioning against bedwetting with an electrical apparatus, which, when the circuit is completed by urine excreted, activates an alarm and turns on a light in the patient's room. This principle is not new. It was reported fifty years ago by Pfaundler<sup>18</sup> and again in 1908 and 1910 by Genouville<sup>19</sup> and Rémy-Roux<sup>20</sup> respectively. Again in 1916 a similar apparatus was tried in England<sup>21</sup> but its use was finally discontinued because it was found most children became accustomed to the bell before becoming conditioned against wetting the bed. This physician commented that the idea might work well in an institution, but it did not seem to in general practice.

The Mowrers<sup>22</sup> presented this treatment again in 1938, but in contradistinction to the previous efforts they inquired extensively into the family situation and the interpersonal conflicts involved. This may account for the 100 per cent success they report in the 30 cases they treated for no more than two months each. The Mowrers proceeded on the theory that enuresis was due, in that large majority of cases which are physically negative, to faulty habit training, at times complicated by unconscious or conscious emotional needs which are not satisfied during the child's waking hours. Probably a young child finds it difficult to awaken to the rather vague pressure of a filling bladder and ignore the more disturbing stimuli during sleep as many youngsters do in reality. Trying to develop this rather complicated feat of bladder control during, sleep is a fairly high level of performance and should not be expected by parents until the child is fully capable of attaining it in the light of his age and specific capabilities. If this training is attempted prematurely, anxiety over failure to achieve may readily develop in parent or child and complicate the ultimate training.

We are acquainted with the fact that training and self-discipline in any child is based on identification and a good relationship with his parents whom the child respects and loves and wants to please, rather than on punishment or discipline from parents or parent figures who are not particularly meaningful in a positive way to the child.<sup>23</sup> From this we might postulate that an important requirement for the development of good training habits is a positive relationship between the child and the person who is going to attempt the toilet training. Also, the many prohibitions and injunctions that constitute socialization of the young child in our culture tend to be inevitably frustrating. The natural reaction to frustration in many children is that of outright defiance or attack on the frustrating adult. Since direct attack is generally forbidden, the child looks for more subtle methods of resisting and in this way finds such issues as constipation, feeding problems, and enuresis. In the Mowrer's group of 30 youngsters they found a definite element of hostility present toward the parents. They stressed that the child's attitude toward the parent must be changed from one of ambivalence to an attitude in which the positive feclings are stronger before training for bladder control at night is instituted. Perhaps, after emotional tensions are resolved, any method of treatment may then prove successful. Hamill<sup>24</sup> reported success in 40 children of a group of 80, treating the enuresis as entirely dependent on personality dynamics. He felt that the child responds by awakening to the stimulus of a full bladder if he wants to. Often an enuretic child will stop if he is in a situation where he desires to be dry, such as on a visit to grandparents for a week or two. In our experience, this is frequently the case when a youngster with emotional problems is admitted to the hospital where the pressures on him are relatively decreased. The child may wet much less than he did at home or may even cease wetting during hospitalization, but the enuresis reappears when the child returns home.

The treatment program that the Mowrers report consists of first removing the sources of tension in the family. Then the patient is fully informed regarding the apparatus and its purpose, and efforts are made to gain his cooperation. The youngster is advised to sleep with no bottoms on his pajamas and the parents are also instructed that "if the child does not awake, the attending adult should arouse the child as quick-

ly as possible while the bell is still ringing." Some parents find it difficult to be awakened abruptly every time the child wets without their own hostilities toward the whole problem being intensified. It is interesting regarding the child's cooperation that the Mowrers note that the box in which the electrical apparatus is contained should be kept locked as a protection against possible damage. This may reflect directly expressed hostility which they have encountered from the child in their experience. Davidson and Douglass<sup>25</sup> report 15 children of a group of 20 treated successfully with this method in a large orphanage after they had first tried suggestion, persuasion, and medication without success. They also stress the importance of removing causative factors and eliminating tensions before treatment is instituted. There is some question whether this mode of treatment represents a true conditioning reaction since 20 to 30 cc. of urine are often voided before the bell is activated. In addition, some children are dry almost from the night the conditioning starts. Another point to consider is that some people are very selective in their response to a bell, that is, they react as they wish to, consciously or unconsciously.

Geppert,<sup>26</sup> in a recent article, reports 90 per cent effectiveness in 42 patients using this conditioning apparatus. He found personality defects also improving in most cases, and believes this to be an indication that such personality problems often are the result rather than the cause of enuresis. Geppert points out the danger of the conditioning device being available to the public as it is now through popular mail order catalogs. Seiger<sup>27</sup> reports 89 per cent response in 106 patients treated with the same method. These patients, however, range from 2½ years of age up, and undoubtedly some of the younger children in his group would have responded spontaneously in the next half year. Seiger feels that learning is the basis of bladder control, and, if learning is not accomplished early by the child, it can be acquired by conditioning. Spock,<sup>28</sup> commenting on these reports, raises the question of possible psychologic harm arising from use of such an electrical apparatus, particularly the effect the conditioning reaction of the bell-ringing, light-flashing experience may have on a timid, anxious, immature 4 year old. He points out, in regard to Seiger's proposal, that there is no evidence that enuresis results from insufficient training efforts, but rather most enuretics have had more than their share of toilet training attempted. Spock conservatively agrees that the electrical conditioning apparatus might do minimal harm and maximum good for some selected patients, possibly the child of 9 or older who is reasonably well adjusted aside from his enuresis, and who is able and willing to take an active part in seeking help for his problem.

### MANAGEMENT

A sound approach to the treatment of a child with enuresis should include first a thorough history. Investigated here would be the characteristics of the enuresis, age and circumstances of onset, frequency and any other physical symptoms that may appear concurrently. Equally important is the child's attitude toward his problem, the parents' attitudes both toward the child and the enuresis, and the role that the cnuresis has come to play in the home. Specific emotional trauma should be noted which might serve as precipitating factors. Also, other behavior problems that the child presents and neurotic traits in his personality pattern must be considered. Important, but more difficult to obtain, is information regarding emotional tensions or disagreements between the parents which may cause anxiety in the child. Knowledge of this sort is usually not given by the parents in the first visits because of its very nature, and may only be forthcoming in later interviews if the doctor emphasizes its importance and offers an uncritical, sympathetic atmosphere in which the parents feel comfortable in divulging such information.

A physical examination is indicated next. While being thorough in every respect, the physical examination should avoid traumatic diagnostic procedures like cystoscopy unless there is a specific indication. Organic factors which are found to be present and appear to definitely contribute to the problem should be treated. If no physical basis for the enuresis is found, the physician should go further into the family conflicts, as well as undesirable attitudes that the parents may be displaying towards the child and his bedwetting. The family requires help to realize the important role that such attitudes may be playing in the problem, and other ways in which to look at the child and his difficulty may be suggested. Also, at this point, unpleasant or uncomfortable toilet facilities might well be remedied or improved upon. Then, having gained the child's cooperation as far as possible, a simple program may be offered of voiding at bedtime and again later at night, generally when the parents retire. The child must be fully awakened when he arises during the night to void. If not awake, he may become conditioned actually to wet in bed during the night. Limiting fluids after dinner appears to be of some value, and may be a way of emphasizing a positive approach involving the child's cooperation. Simple reward from the parents for dry nights is helpful, including use of a chart with stars as a visible sign of achievement. Parents must avoid reactions of disappointment or anger when the child fails to stay dry, and punitive attitudes are to be avoided. Medication may be tried, for instance Dexedrine, if the child appears to be sleeping too soundly. Again, the child's cooperation should be gained and he should understand what is to be expected of the medicine. Finally, in this superficial treatment program, the parents must not expect quick success. They should try this regime for perhaps six months before becoming discouraged. The life of many young enuretic children becomes complicated by anxious parents trying for too brief a period many different treatments or approaches. Only after such a program of encouragement and retraining has been tried for a sufficient length of time might an apparatus such as the electrical conditioning device be considered, and then only for the older child who seems to have a definite desire to be rid of his bedwetting problem.

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If the child does not respond to this program of treatment or if the enuresis appears to be relatively secondary to other personality problems or family disturbances, then treatment should be focused on the attitudes and feelings of the child and the family rather than on the enuresis. Continued emphasis on the enuresis alone may even cause the appearance of new symptoms of emotional disturbance.

# SUMMARY

The problem of enuresis, its history, theories of etiology, and modes of treatment, is reviewed. The multitude of causative factors and empirical results regarding enuresis strongly suggest that the real cause and the reasons for the variable results of treatment are not yet known. A comprehensive approach to the enuretic child, his personality, and the attitudes of other members in his family, appears to have a positive effect on whatever specific therapy is used. The problem of why humans are enuretic has not been satisfactorily solved. The fact remains that no other mammal, once past the stage of genuine infantile helplessness, ordinarily soils itself during sleep.

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# The Peptic Ulcer Problem in Infancy and Childhood\*

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This paper is presented in order to review the literature, to emphasize the occurrence of peptic ulceration in childhood, and to report 11 cases.

## REVIEW OF LITERATURE

Cruveilhier¹ reported 3 cases of gastric ulcer discovered at autopsy in 1829. In 1909, Helmholz² reported 9 cases of duodenal ulcer, found at autopsy in atrophic infants. Holt,³ in 1913, studying 95 cases of duodenal ulcer in infants under 1 year of age, found that in the 65 cases in which the age was given, 70 per cent were between the ages of 6 weeks and 5 months. In 1941, Bird, Limper, and Mayer⁴ collected 243 cases of peptic ulcer in children from the world literature. Newman,⁵ in 1942, Ingram⁶ in 1950, and Alexander,⁴ Lemak,⁶ and Morgan⁶ in 1951, have emphasized the roentgenologic picture.

Including my own cases, I have collected 481 cases of peptic ulcer in children from the literature up to June 1953. (table 1). The incidence

of age who have subclinical gastric ulcer. There are 32 case reports of chronic duodenal ulcer in the literature.<sup>11</sup> The incidence of peptic ulcer in children at autopsy varies from 0.1 to 0.2 per cent.

### ETIOLOGY OF PEPTIC ULCER

Peptic ulcer is the result of hydrochloric acidpepsin proteolysis of the gastroduodenal mucosa. Hypersecretion characterizes duodenal ulcer, and decreased tissue resistance predominates in gastric ulcer. The maximum gastric acidity is usually reached within twenty-four hours after birth.<sup>12</sup> It then falls rapidly and remains low during infancy. Numerous causes have been suggested for the gastric hypersecretion in duodenal ulcer. Some of these are larger parietal cell masses, release of histamine from the ulcer, failure of enterogastrone secretion by the mucosa of the small intestine, hyperactivity of the gastric antrum, adrenal cortical hyperactivity, vagal hyperactivity, emotional disorders, and an over-

TABLE 1
481 PEPTIC ULCERS COLLECTED FROM THE LITERATURE

Age	Male	Female	Duodenal	Gastric	Number operated on	Stenosis	Per- foration	Bleeding
0 to 14 days	32	23	33	40	13	1	29	31
14 days to 1 year	45	23	80	20	12	11	22	42
1 to 6 years	39	22	62	10	10	2	6	22
6 to 11 years	71	35	91	24	33	11	16	22
11 to 15 years	87	29	101	20	68	31	28	7
Totals	274	132	367	114	136	56	101	124

in males is twice that in females. There are three times as many duodenal ulcerations as gastric. Using Proctor's criteria, 41 cases of chronic gastric ulcer in children have been reported. There may be 50,000 children between 1 and 6 years

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active sympathetic or parasympathetic center in the hypothalamus.

Decreased tissue resistance may be due to deficiency of the gastric mucus, mucosal atrophy, and vascular disturbances, such as vaso-constriction or hyperemia and capillary stasis. Other theories of ulcer formation concern the roles of gastritis, infection, allergy, thalamic or

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hypothalamic dysrhythmia, protein deficiency, constitutional susceptibility, heredity, and the sex hormones. Curling<sup>13</sup> first noted the association between acute ulcerations of the duodenum and burns, which probably cause congestion and edema of the mucosa. In 21 out of every 1,000 cases of chronic peptic ulcer in adults the disease may date back to childhood.<sup>14</sup>

An acute ulcer may be the initial lesion in the development of a chronic peptic ulcer. In a series of 943 consecutive autopsies, 15 acute ulcers were found in 104 cases, in the esophagus, stomach, and duodenum. The average incidence by decades was 14 per cent. The incidence of ulcers and mucosal hemorrhages was highest following severe burns, 66.6 per cent. Birth trauma was associated with acute lesions in 29.4 per cent of cases. When severe destruction of the adrenal was present, the incidence of acute ulcers and mucosal hemorrhages was 71.4 per cent. Acute ulcers are characteristic of the shock phase of the general adaptation syndrome.16 These occur more readily than usual in adrenalectomized animals, which are unable to develop countershock phenomena.

It is possible that an ulcer may begin as a region of inflammation and that some inflammatory reactions may not result in ulcer but persist in the form of a duodenitis.<sup>17</sup> Pathologically, duodenitis shows inflammation of the mucosa with occasionally one or more erosions. The most prominent radiographic finding in duodenitis is pronounced irritability of the duodenal cap. Clinically these cases cannot be separated from those with ulcer.

# DISEASES COEXISTENT WITH PEPTIC ULCER

Peptic ulceration in children has occurred in association with atresia of the duodenum, stenosis of the colon, congenital defect in the musculature of the stomach, cirrhosis of the liver, fibrocystic disease of the pancreas, marasmus, erythroblastosis, intracranial tumor, hemorrhage, infection, poliomyclitis, snake bite, and trauma to the abdomen. Most ulcers in children, however, occur without obvious cause.

# SIGNS AND SYMPTOMS

In childhood, either the peptic ulceration is the chief clinical and pathologic disease, or the child is already sick. In the neonatal and infantile group, the mortality of peptic ulcer is 90 per cent. These ulcers bleed or perforate spontaneously and usually are quickly fatal. There have been 29 stomach perforations in newborns reported in the literature, and 3 have recovered with surgery. These babies usually exhibit cya-

nosis and abdominal distention and may also have hematemesis and melena. During the preschool and school years, the subjective ulcer symptoms of children are more classical. Abdominal pain at any age relieved by food or emesis is suspicious of ulcer. Other common symptoms are recurrent vague pains which are usually epigastric or periumbilical in location. Chronic anorexia, malaise, and weight loss also may occur, though they are not frequent in this series. In older children, the ulcer may progress rapidly to perforation. The chief complications at any age are perforation, hemorrhage, and pyloric stenosis. In this series, hemorrhage occurred in 42 per cent under 1 year of age and in 27 per cent of the whole group.

# PATHOLOGY

Acute ulcers in children are small, hemorrhagic, punched out lesions, involving only the mucosa and submucosa. The chronic ulcers, like those in adults, have an indurated, fibrotic edge, and the mucosa and muscle end at the ulcer. The ulcer floor is made up of scar tissue and granulation tissue.

### CASE REPORTS

Since 1949 I have observed 14 cases of peptic ulcer (table 2) and 7 cases of duodenitis (table 3). Cases 1, 2, and 12 from table 2 were reported in the January 1950 issue of *Minnesota Medicine*. The chief symptoms in the peptic ulcer series were abdominal pain, anorexia, and vomiting. Most of the children had either continuous or recurrent pain. Case 12 was the only case in which the pain was severe or suggestive of major abdominal pathology.

The children who were found to have pronounced spasm of the duodenal bulb on radiologic examination, with no ulcer crater, had abdominal complaints indistinguishable chinically from those of the peptic ulcer group.

# TREATMENT

Ulcers in children respond dramatically to the use of a bland diet and an effective antacid such as calcium carbonate. Only 1 patient in this group, except for the fatal cases, required hospitalization. In most of my cases, complete healing radiologically was seen within six to twelve weeks. Clinically the children seem well almost from the beginning of therapy.

# SUMMARY AND CONCLUSIONS

Accounts of 11 cases of peptic ulcer occurring in children have been added to the literature, bringing the total cases reported to 481. The literature has been reviewed, and the etiology, signs and

TABLE 2 PEPTIC ULCER — QUAIN AND RAMSTAD CLINIC

TABLE 3 DUODENITIS - QUAIN AND RAMSTAD CLINIC

Case	?			
1.	M	5 days	Gastric	Perforation greater curvature. Expired.
2.	M	23 days	Duodenal	Perforated. Expired. Stenosis of sigmoid.
3.	F	5 years	Gastric	Vomiting, anorexia.
4.	F	8 years	Gastric	Perforated. Bulbar polio. Expired.
5.	М	8 years	Duodenal	Anorexia, stomach ache for 24 hours.
6.	M	8½ years	Duodenal	Recurring epigastric pain in mornings 5 months.
7.	F	9 years	Duodenal	Vague epigastric pain.
8.	M	11 years	Duodenal	Epigastric pain.
9.	F	11 years	Duodenal	Epigastric pain.
10.	F	13 years	Duodenal	Anorexia, weight loss.
11.	M	13 years	Duodenal	Brain tumor, ependy- moma. Expired.
12.	M	14 years	Duodenal	Epigastric pain, vomiting, symptoms for 7 years.
13.	M	14 years	Duodenal	Abdominal pain 1 hour p.c.
14.	M	15 years	Duodenal	Continuous epigastric pain, duration 1 week.

Case			
1.	M	6 years	Epigastric pain, duration lyear.
2.	M	8 years	Vomiting, headaches.
3.	M	8 years	Stomach ache, duration 2 months.
4.	F	9 years	Epigastric pain.
5.	М	9 years	Stomach pain 4 months. Eats in spells.
6.	М	11 years	Abdominal pain, duration 1 year.
7.	M	13 years	Epigastric pain.

symptoms, pathology, and treatment of peptic ulcer in infancy and childhood are discussed.

The conclusion is reached that peptic ulcer is common during childhood and that infants with cyanosis and abdominal distention, and older children with recurrent abdominal pain, should have a thorough radiologic examination of the stomach and duodenum to rule out this lesion. Also, 7 cases of duodenitis, a pathologic and radiologic entity, have been presented. The fact is emphasized that these cases cannot be distinguished from those with peptic ulcer on purely clinical grounds.

A paper like this is necessarily a cooperative affair, and so I wish to thank all the members of the Quain and Ramstad Clinic who helped with its preparation.

Note: Since the preparation of this paper, 64 cases of peptic ulcers in children have been added to the literature. These reports include 2 newborns with duodenal perforations and 1 chronic duodenal ulcer in a 12-year old girl who was treated by extensive gastric resection.

EDITOR'S NOTE: Due to space limitations, only a partial list of references is included. A complete bibliography is available from the editors.

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# The Pediatrician and Congenital Heart Disease

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In RECENT years, advances in regard to congenital cardiac defects have made such rapid strides that I believe a review of the role that the pediatrician plays in dealing with the parents and child with a congenital defect would be worthwhile.

Since the pediatrician is closer to the family than any other medical contact, he must have a knowledge of the psychologic problems which confront the parents as well as the reactions of the child himself. The pediatrician's role is one of diagnosis and advice relative to what should be done medically and surgically for these cases. When a congenital heart defect is suspected in the first few days of life, the pediatrician wonders whether one or both of the parents should be informed. I feel it only fair to share this knowledge with the father in some instances and both parents in others. The choice of these two decisions entails a knowledge of the psychologic makeup of the mother. The unpleasantness of postpartum neurosis which generally produces a great deal of instability in the mother during the first few weeks postpartum must be considered. During this period, the shock and worry about congenital heart defects in a newborn can have a very harmful effect on the mother's emotions. When nothing can be gained by working this problem out so early in life, it might be wise to postpone such discussions until the mother has become accustomed to the baby and is no longer afraid of the over-all problem. If, on the other hand, heart failure or death in the first few days or weeks of life might occur, the problem must be faced and decisions made accordingly.

Our philosophy at the University of Minnesota at the present time forces us to pinpoint the diagnosis on any cyanotic congenital heart as soon as possible. The problem is very real, and

PAUL F. DWAN, a 1928 graduate of Harvard Medical School, is clinical associate professor of pediatrics at University of Minnesota hospitals, Minneapolis, and chief cardiologist at Children's Hospital, St. Paul. the first few weeks of life may be the only opportunity we have to save the baby's life. Sudden death among the cyanotic newborn group is rather common, but this picture can be altered by an accurate, early diagnosis which leads to corrective or palliative surgery. Sometimes an accurate diagnosis can be made by the ordinary studies such as physical examination, electrocardiography, and roentgen studies. If diagnosis by these means is possible and the child is doing quite well in spite of his cyanosis, surgery can be postponed until the baby is in better condition. If surgery cannot wait, however, I believe that the cyanotic group should receive angiocardiography as soon as possible so that if any corrective surgery can be done, it can be performed early in life. We feel that the hazards are such that this may be our only chance to save the infant's life. Too often the inclination is to procrastinate and then suddenly the baby develops heart failure or dies.

In the noncyanotic group, we feel that any baby in heart failure, not doing well, or not making a satisfactory weight gain should be accurately diagnosed, if possible. This procedure may entail use of cardiac catheterization or retrograde aertography in an attempt to diagnose a patent ductus arteriosus which is a frequent cause of failure in the neonatal period. Failure due to this cause can be corrected easily and safely even at this stage and the diagnosis should not be missed. We have had several cases of coarctation of the aorta which produced heart failure and which were easily diagnosed by the finding of absent femoral pulses and blood pressure in the lower extremities. These conditions were corrected with excellent surgical results. These two situations alone constitute a large proportion of the infants who die in the neonatal period. We feel that the parents must be taken into our confidence in these matters in order to gain their cooperation and thus give the surgeons a chance to correct defects before failure is produced or other evidences of serious impairment occur.

A baby with a serious form of congenital heart disease is in an especially dangerous situation when intercurrent minor pediatric problems arise. The first of these problems is the irritation of the eyes by concentrated silver nitrate, and is especially serious because it occurs in the first few days of life when the balance between life and death is delicate. Babies frequently have a sterile purulent discharge after silver nitrate introduction at birth. Whereas the recommended prophylactic silver nitrate rarely causes trouble, the drug often becomes concentrated in the gelatine capsules in which each individual dose is stored so that silver nitrate strengths as high as 5 and 10 per cent can be introduced into the eyes. This causes a purulent sterile discharge which finds its way into the nose of the baby by way of the lacrimal duct, sets up further irritation which then can produce mucous plugs which can find their way to the larynx and trachea. The baby whose life is hanging by a slender thread can be placed in serious difficulty by obstruction of his airway.

The other pediatric problems, such as vomiting with inhalation of vomitus, can similarly produce emergencies which are serious. In the congenital heart group, the presence of diarrhea with its dehydration is again a dangerous situation, because the blood can become so concentrated that it cannot flow through the small brain arterioles and paralysis can develop. The cyanotic baby is consequently in constant danger of these minor emergencies and the mothers should always be warned so that proper treatment can be instituted.

At the University of Minnesota, we have found use of models of the heart as well as artists' illustrations of the various cardiac defects are of great advantage. These illustrations are so made that the normal heart is placed on the left hand side of the sheet, and the heart with the defect is placed on the right hand side with a definite identifying label. Parents find the model heart a help in following the normal circulation. Then, when the child's abnormality is explained, they have a rather clear-cut picture of the problem and what we propose to do about it. They are told to keep the diagram in a safe place so in future years they can refer to it. People often lack true understanding of the condition and distort the words used by the doctor when relating the story to friends and relatives. We feel that this objective material helps avoid this situation. Also, people frequently move from one city to another and are apt to present the story incorrectly to another physician. Whereas, if they have a diagram which is dated and signed by the original examiner, the next physician can be helped greatly.

I have listed 8 of the psychologic responses of the parents to the problem of congenital heart disease in an attempt to acquire some chronologic order so that the problem will be better understood. Each reaction will be discussed separately.

- 1. Disappointment
- 2. Frustration
- 3. Resentment and disbelief
- 4. Guilt
  - a. Loss of ego for male
  - b. Female question of harmful effects of tobacco, alcohol, loss of sleep
  - c. God's punishment.
- 5. Remorse
- 6. Adjustment
- 7. Cooperation and resignation
- 8. Reversal of the problem all over again when the child reaches the age of 10 or 12 years.

The first reaction on the part of the parents is disappointment because they have given birth to a defective child. This emotion is easy to understand, since for a long time they have been anticipating the birth of a fine, normal, healthy baby. A sense of frustration follows this feeling. Parents know they have a problem and do not know which way to turn or what to do about it. The pediatrician can be of great help at this stage by talking to the parents kindly and at length concerning the over-all picture of congenital heart defects as well as the specific picture presenting itself in the child in question. If investigative centers are available, the pediatrician can refer the patient for further study if he feels help is needed. During this stage, the sense of frustration can be allayed by assuring the parents that things can be done to correct these defects, and that medical science is working steadily to improve the outlook of these children and is constantly devising new methods of surgical approach.

In spite of a certain amount of reassurance, this stage changes to a stage of resentment and disbelief. This period is very trying to the pediatrician, and the parents are apt to seek advice elsewhere. Unless the pediatrician is aware of the situation, he may lose the case. Consultative help is a reassurance to the parents concerning the nature of the problem. The parents resent the fact that this misfortune happened to them. This unhappy frame of mind leads to disbelief that the attending physician knows what he is talking about and to the belief that in some way

their baby is being neglected. My practice has been to outline these various steps, predicting at about what period these emotional disturbances will occur so that when they do arise, the pediatrician can remind parents that he has warned them about these problems and that their reactions are normal. This statement in itself has a very reassuring effect and gives the parents confidence in the attending physician.

The fourth stage is that of guilt and takes several forms. The father feels guilty because of loss of ego. He feels that he is incapable of producing a healthy baby and that something must be wrong with him. A review of the causes of congenital defects at this time helps the father overcome this feeling. The mother worries for fear she is responsible for the unhappy situation because she did not take proper care of herself during pregnancy. She fears she allowed herself to become run down by overwork or worry, by loss of sleep, or indulgence in such things as tobacco and alcohol, and that in this way she may have injured her baby. A very real problem can result and is very trying, especially if faced during the period of emotional instability which follows childbirth. Just recently I went over these factors of emotional disturbances with a father whose new baby, the fifth in the family, had a congenital heart defect leading to heart failure. He felt very strongly that his wife had a definite sense of guilt-and worry for fear she had been to blame because she had not followed his advice during her pregnancy and rested more. He felt so strongly concerning this that he did not show the list of disturbances to the mother for fear it would disturb her. This, of course, can be a very serious problem, especially in highly nervous groups. Again, reassurance as to the usual causes of congenital heart disease will assuage this situation.

The fifth reaction, that of remorse, usually follows closely the reaction of guilt, and the parents feel their previous attitudes were unfair. They become humble and receptive to advice during this stage. Then follows the period of adjustment in which the entire family must learn to cope with the problem in its proper aspect. Other members of the family are asked to assist in this stage of adjustment, and the result is usually a happy home situation in which the parents are brought closer together than ever before. The reverse sometimes occurs because the whole problem has been such a worry that the usual minor disturbances of married life take on an aspect of unjustified importance and lead to a great deal of family strife. However, usually families become adjusted to their individual responsibilities, and then the seventh stage of cooperation with the physician and resignation to the problem follows. If the condition is serious and does not yield to correction, this whole group of reactions will arise sometime later in the child's life, and the parents again will go through the same cycle. Understanding of this cycle, then, is of great help to the pediatrician because he not only must deal with the child but also with the parents.

Of course, the matter of surgical intervention and the parents' reaction to it varies, depending upon what stage of the cycle the parents are experiencing at the time. Several different reactions to surgery have been experienced by all of ns working with this problem. The first reaction appears during the stage of frustration when parents feel that anything should be risked which could be of possible benefit to the child. They fail to see how they can cope with the problem and all its worries and frightening possibilities. Many times these fears must be allayed so that the time for surgery can be properly chosen. The other reaction to surgery is fear, and parents would rather have nothing done than risk the death of the child. Some people have a definite fatalistic attitude, which is especially true of older generations who believe that physicians should not interfere with the general over-all plan of life. In some primitive people, there is even an element of superstition at these times. This is a difficult situation to cope with and is doubly difficult when a pediatrician gives his advice to a young couple who are under pressure from grandparents who feel that nothing should be done. I have found this a rather frequent and trying experience in the past. The younger generation of parents reads so much in the newspapers and periodicals about advances in cardiovascular surgery that they are more eager to cooperate with the doctor's instructions.

An experience uppermost in my mind involved a 7-year-old boy with a tetralogy of Fallot who had been cyanotic since early infancy. This child was a product of a second marriage. The father, at the time when surgery was being considered, was 72 years of age and accustomed to holding the child in his lap and weeping over the situation with him, telling him that he would not let the doctors operate because an operation would kill him. Of course, we could not attempt any surgical approach while this situation existed and had to wait until the father changed his attitude completely. He could then reassure

(Continued on page 206)

# Talking Primates— Their Symptoms and Dis-ease

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To say that man has evolved rather than reproved by means of spontaneous combustion may not mean much to the traditionally oriented person – one who never questions his beliefs. However, the point of view relevant to man in this discussion of necessity stems from a personal conviction that man today, a talking primate, represents the hierarchy of many millions of years of evolvement from lowly forms to higher mammals. According to the best informed students of life and its evolution, the world is two and one-half billion years old. The simple forms of life emerged about five hundred million years ago. The higher mammals have been around somewhere between one and sixty million years. Man's crudest ape-like beginnings go back only about five hundred thousand years.

When man's consciousness of self dawned, and his gregarious neighbors organized groups, environmental controls became important for the safety and security of the individual. At first, before man talked, these controls were managed, I presume, by brute physical force. The war-like activities in man's early society were probably executed with the help of such implements as sticks and stones. Then the organs serving many biologic needs of breathing, sucking, chewing, and swallowing began to take over an added function of talking. This usurpation of speech as a means of environmental controls was an important step in the furtherance of what has been called civilization.

If one views life as it operates today with any degree of honesty and objectivity, one finds it difficult to use the word civilization as being very meaningful. History testifies to the fact that every quarter of a century millions of Homo sapiens are slaughtered on the battlefield. This

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is the eatastrophie blight I wish to blame on us, talking primates. Wars are not only fought by people, but manufactured by them. The only single importance that life holds, but rarely do we recognize it, is that you and I are the most significant thing, person, element, factor, or what have you in this world. If this is so, then why project blame for periodic bloody disasters on things other than the prime movers of life itself. Can you think of any institution, law, or social group that was not promulgated by man? As far as being important to life is concerned, we have every reason to feel superior.

Inasmueh as my main interest in man is the fact that he talks, I wish to project a few indictments of him first as a human being and sec-

ondly as a talking primate.

The progress toward building a communal world has indeed been meager. In spite of preachings, prayers, and longings for honest human relations, the best we can say is that man has pretty much made a mess of life. Read Bruee Caton's *The Warlords in Washington* and Burstein's *The Politics of Murder* if you are in doubt.

My main indietment of man is that he is *in* his own way. He is his own enemy. So long as fears, inhibitions, frustrations, and deceits bespeak his personality, he can never expect to build for himself and others a brotherhood of man. He lives in a monkey culture—is still steeped in dog or gut behavior. His training has tended to make him believe that he can think his way out. This seems futile when one realizes how emotional man still is, and probably always will be. Some hope dawns that with increased knowledge and understanding he may learn to feel his way out and thus build empires more suited to his humble longings.

Talking is an excellent device for the release of man's savage impulses. Speech is symptomatic of what one is. Carlyle said, "What you are speaks so loud I can't hear what you say." It is by listening to and analyzing man's use of excuses, projections, and compensations that

some insight is gained into the character of his feelings of insecurity. He is not at home with himself. He is lonely in his frustrations. It is here the trouble in human relations begins. Talking is a must in this gregarious world that we have built—speech patterns of deceit, fear, and arrogance elicit similar patterns of response in others. Thus, in our maladjustments, we wallow in superficiality, self-consciousness, and unsanctioned personality traits. This is the *dis-ease* of which I speak. How did man get into his own way and why has he chosen such a fantastic way out?

In answer to the first part of the above question may I point out that certainly man had no part in the choice of his birth nor his early environment. Not realizing that a child is a talking primate and, therefore, very susceptible and responsive to training, parents naturally made many mistakes. The essential process of growth and maturation is what is known as *conditioning*. The works of Pavlov illustrated this phenomenon in dogs and the experiments of Menzies, Hudgins, Ellson, and many others have shown that human beings can also be conditioned.

Salter in his book Conditioned Reflex Therapy points out that the basic law of life is excitation, and that by means of man's early training he has become inhibited. Parents place too many stoplights in the way of a child's natural expression of his emotions. The child has been forced to follow a too rigid pattern of behavior for him to grow up feeling secure in himself. The result has been that children, by the time they enter school, are already in their own way, unnatural, inhibited, fearful, self-conscious and suffering from dis-ease. These and other symptoms are signs of deep-seated insecurities developed because of parental mismanagement. The most unfortunate fact of these proceedings is that we have been taught that the best life involves living up to our ideals. And this would be true were it not for the fact that our conditionings keep us from it. Salter says "There is nothing wrong in the individual's 'should' department. It is the 'able to' department that causes the difficulty." Therefore, we can only live up to our conditionings.

Man, being in his own way, must get out, and, because he talks and listens so easily, he does so largely by talking. I said earlier that man speaks what he is. The methods we employ in relief of guilts, insecurities, inhibitions, and frustrations have been practiced by us so long that they are currently accepted by most people. May I point out that so long as man bespeaks his emotions

through the use of ruses, fronts, and other deceptive devices he will never build a lasting brotherhood or communal society. Wars will continue to break forth every quarter of a century. Social disruption and general unhappiness among our citizenry will be the vogue. The main reason for this is that man's customary way out is built upon deceit and not honesty. Our deceits and false purposes are too superficially manufactured in the mind of man to ever be trusted by anyone, least by our neighbors.

Need it ever be thus? The answer is no, provided we, as talking primates, can make an about face and understand the reasons for our behavior and be willing to confess our so-called "emotional sins"—in other words, be honest with ourselves and others about the most important truths existing inside our skins. But this is too much to hope for. Adults are hard to change. They love to cling to their illusions that they are rational and not emotional; that they are supermen and can with "will power" solve all problems of civilization.

So, speaking to a group of pediatricians, what could be more appropriate than to suggest that the hope of a better world lies in a different kind of person—a new generation of children whose rearing has conditioned them to be emotionally free, excitatory, happy, and lovable.

Briefly, my message is this – your great contribution, as medical men, to the physical well being of children is well recognized. Your primary business is to help children overcome their physical ailments. You prescribe diets and inoculate for the prevention of many illnesses. You, too, have found that many ailments have psychologic causes. If you have not referred children to psychiatrists, you have offered now and then sound advice for parents to follow. Can you do more than that? Well, that depends on your inherent belief in the possibility of a better adjusted citizen for tomorrow. Aside from physical care and therapy, you can give the parents a good deal of sound mental and emotional help regarding the rearing of their children. If you are an inhibited victim of your parental training and have analyzed yourself, then you can prevent the development of insecurities in tomorrow's children by talking to parents about conditioning. No one has as much opportunity to deal with parents and children as the pediatrician. Treating the whole person becomes an essential part of medical practice.

May I close with a few suggested topics which a pediatrician might consider, when dealing with parents. 1. Speech. The parents should be told that the best speech comes from the least interference on the part of the parent. If the child is born with a speech difference, the parent should show no anxiety, but should help the child learn to accept and live with it.

2. Feeding and elimination. To be managed according to natural developmental laws of hunger and sphincter development. Forcing and discipline can injure the basic personality structure.

- 3. Enuresis. Parents can well afford to allow the child to have plenty of fluids until bedtime, so that the normal bladder tensions can obtain to awaken him. Add to this the admonition that whole hearted approval of the act by parents will avoid embarrassment and conditioned inhibitions on the part of the child. In addition to early subsidence of bedwetting, the child by this method will have preserved a healthy mental and emotional attitude.
- 4. Meddling with the child's native sidedness and peripheral handedness. This can be deleterious to the child's neural system. Speech defects, bedwetting, strabismus, muscular incoordination, and delinquent behavior can ensue when the child's natural inherent sinistral bias is not respected.

5. Rewards and punishment. Traditionally, these concepts are dealt with in order to develop guilts and egocentricity in the child, way out of

proportion to a normal personality setting. This need not be the case if a child is taught self competition.

- 6. Parent's conduct. An adequate adjustment on the part of the parents in relation to their own insecurities, be they racc, nationality, physical differences, social, or academic inferiorities is essential to the development of wholesome attitudes in children. Unless the parents can accept these differences for what they are, the child may reflect a similar problem in the later years of his life.
- 7. Love and affection. These emotions go hand in hand with the development of social responsibilities, and are another important consideration in child rearing.

These are only a few of the well-known facets of behavior which the pediatrician can observe when dealing with parents and children. To some degree he can assist the parents toward a correction of problems which in the past have, because they were misunderstood and not adequately managed, stood in the way of a free, responsible, sympathetic, and honest talking primate — one free from dis-ease.

Finally — "To save face, keep the lower part of it shut" is an old Chinese proverb. Might not we all do better in building a nonwar world by practicing the implications of this very pungent remark?

Infants may suffer from physiologic genu varum until the fourth or fifth year. The roentgenograms of all of 14 patients studied by John F. Holt, M.D., Howard B. Latourette, M.D. and Ernest H. Watson, M.D., of the University of Michigan, Ann Arbor, showed thickening of the femoral and tibial inner diaphyseal cortex proportionate to the degree of bowing. In such cases, the medially directed apex of each epiphysis of the femur is triangular rather than oval and often appears fragmented. Similar alterations in shape are less frequent in the tibia. Accentuated flaring of the medial metaphyses always appears at the knees; the changes are more evident in the thighbone and in some instances seem to be actual bony overgrowth. Internal angulation of the distal metaphysis of the shinbone and slight wedging of the adjacent epiphysis are often associated with the outward bowing. The findings are incompatible with any disease, the subjects are normal, and regression is spontaneous.

JOHN F. HOLT, HOWARD B. LATOURETTE, and ERNEST H. WATSON: J.A.M.A. 154:390-394, 1954.



Our readers will recall that two years ago we published a series of letters from Dr. Ancel Keys, head of the department of physiological hygiene at the University of Minnesota, to Dr. J. A. Myers and the readers of The Journal-Lancet. The letters were accounts of his medical observations during a year of foreign travel. Dr. Keys is now in Naples doing further research and studying in more detail cholesterol metabolism and its relationship to nutrition and cardiovascular disease. We are delighted to have the opportunity to present the first in another series of letters from him telling of his work and impressions in a foreign country.

# Notes from a Medical Journey

February 24, 1954

Faculta di Medicina, Universita di Napoli, Naples, Italy

Dear Jay:

Two years ago in Naples at this time we were finishing our first field exploration of the relationships between "degenerative" heart disease, the cholesterol in the blood serum, and the habitual diet. Now we are back again in the shadow of Vesuvius, doing a much more detailed study with a wealth of experience gathered since in England, in Spain, and Minnesota, to guide us. The guesses we began with are now a theory. So far it stands up under the test of many new data and clearly it warrants the most intensive examination. We are a long way from having all the answers, but it is certain there is a major relationship between the diet and the blood serum cholesterol and lipoprotein picture, on the one hand, and between the blood chemistry and the development of atherosclerosis, on the other.

Evidence continues to accumulate that the incidence of atherosclerosis and "degenerative" heart disease in Italy, is, indeed, much less than among American men of the same age. And this fact nicely explains why the total mortality rate from all causes for men of given ages from 35 to 65 is considerably lower here than at home. That this is related to the low fat content of the diet is further indicated by the new (unpublished) data from our colleagues in South Africa who have been studying the local Bantu in comparison with South Africans of European descent who are, like ourselves, on a high fat diet.

The most important characteristic of the diet seems to be the content of total fats. We are unable to find any difference between the various common food fats and oils in this regard and even the total calorie content of the diet seems, by itself, to be of relatively small consequence. That is to say that, other things being equal, relative obesity may be of small consequence in producing atherosclerosis, though it may aggravate the clinical picture resulting from a given degree of atherosclerosis. Finally, all of the evidence continues to indicate that the cholesterol in the diet is of no importance to man. Switching from butter to margarine will not help!

This is the general picture of the problem as we begin the work here under far more auspicious circumstances than faced us two years ago. On the practical side, I now have about a dozen collaborators here instead of just Margaret and Dr. Flaminio Fidanza as before, and our thorough preparations have provided us with highly efficient methods and an abundance of human subjects. Dr. Fidanza, grown in local prestige and in experience from his year's Rockefeller fellowship with me in Minnesota, has the laboratories well arranged, the subjects on tap at the right time, and dashes around in high good humor attending to a thousand details. Professor Gino Bergami has oiled the way in high official circles and has taken great delight in devising a most efficient apparatus to dry our cholesterol extracts. Professor Ruggiero Marotta is working hard to make the clinical and hospital material available, and Professor F. di Lorenzo has seen to it that we have the city clerical workers and the entire fire department personnel as subjects.

Margaret again manages the department of cholesterol analysis with the able assistance of Dr. Ratko Buzina of Zagreb, Yugoslavia, while Dr. Bengt Swahn of Lund, Sweden, runs his paper electrophoresis analysis of the lipoproteins on all of the samples. Dr. B. Bronte Stewart of London and Cape Town helps in these chemical studies as well as in some of the clinical work; he is to return to Cape Town where our old friend Professor John Brock is starting similar work in a long-distance collaboration. Dr. Joseph T. Doyle of Albany, New York, currently has charge of the clinical work and is preparing the ground for the arrival next week of the rest of the clinical team consisting of Dr. Paul D. White of Boston, Professor H. Malmros and Dr. Gunnar Björck, both of Lund, Sweden. Finally, Ernest Klepetar, Actuary of the Mutual Service Insurance Company (St. Paul), is in constant consultation and work with the Italian insurance companies gathering data on the mortality experience here as compared with the United States. In this project we have true international collaboration without a hint of politics.

Naples has changed little in two years except for the increased traffic, which now truly surpasses description and is calculated to terrify the inexperienced driver and pedestrian alike. I find the Plymouth station wagon is a lot harder to drive here than the little Hillman we had the last time, but it is invaluable and is constantly at work carting around subjects, staff, and apparatus. One important group of subjects consists of the heavy workers at the ILVA steel mills a few miles out of Naples proper, and there we start work each morning at 7 a.m. A little after 9 a.m. we are back working with the firemen. The main university clinics are close to the "Istituto" where we have our headquarters, but some of the biggest hospitals are a long way off and the net result is that the Plymouth is constantly hard at work.

We, too, are constantly hard at work on a schedule that must be cut down a bit eventually before chronic fatigue leads to collapse. Not all of us are up at 6 a.m. to start for ILVA, but the full day at the lab starts at 9 a.m. and we are not always able to finish by 7 p.m. The Italian custom is to take close to two hours for lunch but we all eat in the lab; it takes ten to fifteen minutes to eat our bread, cheese, sausage, fruit,

and wine. Breakfast is a cup of coffee and milk ("caffe latte") and a raised doughnut at a coffee bar. Our one real meal a day is taken, after a glass of vermouth, at about 9 p.m. But the work is going very well indeed and we are all feeling fit except for the cold which congeals the marrow of our bones in the laboratories and all the official buildings. Today it has warmed up a bit and the temperature in the lab is now at noon 59° F.

Obviously, there has been little opportunity for sightseeing and relaxation so far. Spare moments are snatched for studying Italian -- which has more grammatical complications than German, I think -- and for essential correspondence. I have a lot of the latter in connection with the forthcoming World Congress of Cardiology in Washington next September. The Congress is to open with a morning devoted to the epidemiology of cardiovascular disease for which Paul White and I are to be co-chairmen. I have the first half on coronary disease and have now lined up top-flight speakers from England, South Africa, Japan, and Sweden, as well as the United States, so this job is about done. Now I may have time to write to our children who are with their grandparents in La Jolla, California. And tonight we are going to the opera, "La Nozze di Figaro."

So far we have been to the opera only once ("Rigoletto") on this visit. As always seems to be the case at the Teatro di San Carlo, the singing was wonderful, the orchestra more precise than at the Metropolitan in New York, the audience dazzling with jewels and magnificent gowns, and the whole experience an adventure into never-never land. And so tonight it will be a mad dash to get into evening clothes, grab a bite and hope to get into our seats before the curtain rises at around 9:20. The coffee we shall take between the acts will not, I trust, keep us awake when we get to bed at about 1:30; I know it will not help me to pop out of bed at 6 a.m. tomorrow morning!

With best wishes to all our friends in Minnesota,

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Autopsy Diagnosis of Congenitally Malformed Hearts, by MAURICE LEV, M.D., pathologist and chief of research laboratories, Mount Sinai Hospital of Miami, Miami Beach, Florida, 1953. Springfield, Illinois: Charles C Thomas, 195 pages, 192 illustrations. \$7.50.

This monograph, written primarily to assist the pathologist in the dissection and diagnosis of congenitally malformed hearts, will be of great value for the pathology student who rapidly recognizes that the dissection of infants' hearts is more difficult and subject to error than the examination of adults' hearts. The general pathologist, who may deal infrequently with such abnormalities, will find the account a guide to their examination and interpretation. The book is divided into three parts. The first section includes a description of the dissection and examination of the congenitally abnormal hearts. The second part deals with individual abnormalities that may be found in the pericardium, great vessels, and heart proper. The third part discusses various pathologic conditions which may be associated together to form pathologic complexes. The writing is lucid, and the monograph is well illustrated with representative photographs which for the most part are of excellent quality. The book makes no attempt to give an exhaustive study of the pathology, but has an excellent bibliography for those individuals wishing to study any particular abnormality more thoroughly.

JOHN I. COE, M.D.

Modern Concepts in Medicine, by JULIUS JENSEN, Ph.D., M.R.C.S. (England), L.R.C.P. (London), 1953. St. Louis: C. V. Mosby Co., 636 pages. \$11.50.

In his "The Revolt of the Masses," the distinguished Spanish philosopher and political scientist bewails the "barbarism of specialisation." He states "the specialist knows very well his own, tiny corner of the universe; he is radically ignorant of all the rest." Many contemporary thinkers are also alarmed over the trend of specialisation in several fields of human endeavor, including the arts, as well as science and industry. The author of the present volume is giving voice to the same apprehension in the field of medicine. With the tremendous advancements that have taken place in the



medical sciences, many educators believe that pedagogic methods must be altered. Instead of feeding a multitude of facts to the student of medicine, broad concepts should be inculcated, which are in turn based upon sound scientific data. Then the student, as he matures, may seek out more detailed information for himself in the literature.

Dr. Jensen has been moved to integrate the subject of internal medicine in his book. He apparently has given much thought to this effort, and the reading of Selye's volume on "Stress," and Whyte's "The Next Development in Man" crystallized his thinking to the extent that he packed up textbooks of medicine and monographs and went off for three months to the Island of Nantucket to bring together internal medicine in a unitary manner.

How well has he succeeded in his effort? The reviewer admires the effort, but he is puzzled by the outcome. In the first place, he runs the gamut of all internal medicine and has less than a dozen documented references. The result is that the volume is an admixture of philosophy, factual data, and error. In the introductory chapter on "The Development of Modern Medical Concepts" he makes a sweeping review of medical history, touching upon modern medical practice in England with the statement, "It (health service) is not working satisfactorily at this time and the doetors are threatening to strike unless it is reorganized.'

He then plunges into a discussion of the principles of "adaptation." It would have been desirable for him to have reviewed the principles of organic evolution and to have allocated more precise data on our understanding of genetics, since he does incorporate some of the factors of evolution and genetics in his thesis. He is at his best in his discussion of "The Transportation System" or cardiovascular diseases. Incidentally, enzymes, vitamins, endo-

crines, and the nervous system are discussed under Part IV, which is headed "Cybernetcis!" One could pick out many erroneous or dubions statements relative to the pathogenesis or treatment of disease.

There is considerable question whether any individual is qualified to write a comprehensive modern textbook of internal medicine as Osler did in his day. The field is so broad and complex that such a text can only be accomplished by the coordinated effort of specialists headed by a capable editor. Likewise, multiple authorship may be desired in an effort to write a comprehensive and integrated book, such as Dr. Jensen has attempted. Chemistry and physiology are the foundation stones of internal medicine. The task of the medical teacher and physician is to integrate these basic sciences at the bedside. A sound knowledge of these sciences with extensive clinical experience produces a physician. Obviously, the doctor must, in addition, be motivated by humanitarian objectives. Dr. Jensen has produced a provocative volume, which cannot be recommended as a textbook for internal medicine. It can only supplement volumes now available, and as such it is too discursive, lengthy, and expensive.

WESLEY W. SPINK, M.D.

School Health Problems, by War-REN B. CHENOWITH, director of department of hygiene and student health service, University of Cincinnati; and Theodore K. Sel-Kirk, M.D., assistant professor of clinical pediatrics, University of Cincinnati College of Medicine, 1953. New York: Appleton-Century-Cross, Inc., fourth edition, 446 pages. \$4.00.

This is an introductory text suitable for a course designed for teachers in the primary and secondary schools. The material on growth, control of communicable diseases, nutrition, serious diseases of childhood, teachers' observations, and health of the teacher is especially good. In the chapter on growth, the authors have made excellent use of charts and illustrations to emphasize points of special interest. In the chapter on nutrition and malnutrition, there is a clear presentation of school lunch programs, diet requirements, and caloric values of foods. The causes of malnutrition, its recognition, and management are also discussed, in-

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(Continued from page 202)

cluding the newer concepts of this subject. The authors list many of the findings in cases of dietary deficiencies and the probable causal factors.

The concept of communicable disease as a school health problem has rapidly changed in the past few years because of the research in communicable disease control and the recent development of immunization procedures. Some communicable diseases have become minor problems while others have gained major importance. The authors emphasize these points and also explain the changing concepts in immunization and quarantine regulations. Heart disease and tuberculosis are discussed in the chapter on the most serious diseases of childhood. This information is simple, clear, and concise and of great value to the teacher or health educator. The physical examination and the interpretation of findings are explained in detail. The problem of the child with defects is discussed constructively. Teacher observation, which is of special interest to the student of education and teachers in service, is discussed at length. Here the authors discuss what observation should be made, when medical aid should be sought, and also how signs and symptoms deviating from normal health are to be interpreted. The final chapter deals with the health of the teacher.

P. T. Goggin, M.D.

Fundamentals of Clinical Orthopedics, by Peter A. Casagrande, M.D., and Harold M. Frost, Jr., M.D., 1953. New York: Grune and Stratton, 582 pages. \$18.50. The authors say that it is unfortunate that the average orthopedist knows little about shoes. They believe that it is well to allow from one half to three quarters of an inch extra length in the foot of a child's stockings so that the toes will not be cramped. An infant should never be placed in shoes with thick leather

soles or rigid shanks. His shoes

should be soft to allow maximum

foot freedom so that muscles can

develop. Such shoes should be worn

until the child can walk and balance well. When he is able to walk, he may wear a stiffer leather sole, but he should never wear shoes with rigid shanks or rigid arch supports. The usual longitudinal arch does not develop until after age 5 or 6.

The ball point of the foot should be opposite the site of the greatest width of the shoe or so-called flarc. The tip of the longest toes should lie one half to three quarters of an inch back of the tip of the shoe.

According to the writers, most mild abnormalities of the feet can be corrected by an ordinary straight last shoe with properly prescribed corrections. The heels can be cut to throw the foot in or out. In other words, the heel is made wedgeshaped. Such heels help to correct flat feet, knock knees, and bow legs. The orthopedist often orders a heel and sole lift to compensate for a leg shorter than the other. In making such shoes, the cobbler should taper the front part of the thick sole so that the person can walk normally. Unless this is done, a stifflegged walk will result.

WALTER C. ALVAREZ, M.D.

# American College Health Association News . . .

On Friday, March 12, the University of Nebraska held the sixth annual College Health Day Program. Sponsors were the University Convocation Committee, Student Union Convocation Committee, Department of Physiology, and University Health Services. The panel discussion on Rehabilitation presented the vital story of how physical and mentally handicapped people return to productive living. Howard A. Rusk, M.D., a foremost authority on rehabilitation, and professor and chairman of the department of physical medicine and rehabilitation, New York University College of Medicine, and director of the Institute of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center, took part in the program. This annual event was initiated for the purpose of bringing to the campus an outstanding authority in the field of medicine to discuss with students and faculty members vital problems in the field of health. These College Health Day programs have been extremely successful, and have aided tremendously in making the health service known on the campus and in the state.

A conference on health of college students was held at Wayne University on March 4, sponsored by the Detroit Tuberculosis and Health Society and the Michigan College Health Association in cooperation with Wayne University. Irvin W. Sander, M.D., former president of the ACHA and president of the Michigan College Health Association, was an active participant. "Motivation for Healthful Living" was the theme of the meeting. The conference was attended by representatives of college health services and schools of nursing in Wayne County, Michigan. The schools also sent student representatives. A special invitation was extended to the members of the Michigan College Health Association.

In the morning there was a general session on the theme of motivation for healthful living, and in the afternoon the participants formed discussion groups to explore various areas such as nursing, student health problems, methods of health education, and coordination of the total health program. Although the meeting date followed the winter's worst blizzard, 66 people attended the luncheon and others came for the panel discussions during the afternoon.

Brockport Teachers College, Brockport, New York, needs a physician and a nurse for its health service. For more details, write to Dr. Donald Tower, president of Brockport Teachers College.

Bowling Green State University, Bowling Green, Ohio, is seeking personnel for its student health service. Any interested individuals might contact Miss Jane D. Igou, administrator, University Health Service, Bowling Green State University.



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# PEDIATRICIAN AND HEART DISEASE

(Continued from page 194)

the child that he wanted him to have surgery so that he would be a nice healthy boy. The child was eventually operated on successfully.

In regard to the pediatrician's relationship with the parents, we feel both parents must agree and both feel that they want to go ahead with surgery, rather than have either the father or the mother take the full responsibility with the mate taking a negative attitude. Obviously, if anything goes wrong at surgery, the family situation would be impossible unless both parents understand and are willing to face the hardship together. Again, I feel that no child should be referred for surgery unless parents understand the problem completely and have then asked the pediatrician to arrange for surgery. The physician should never attempt to persuade or force the parents into such a decision.

The pediatrician, of course, has a similar problem to go through with the child in question. The child has no reaction to congenital heart defects in the first three years because he does not know that he is different from other children. From about the third year on, however, he realizes that he is different, that he cannot play with the other children, and that something is wrong. His first reaction is to seek sympathy and he becomes a rather pitiful, maladjusted child who really needs sincere love and affection. This gives him a sense of security so that he finally develops a comfortable acceptance of the situation and is quite well adjusted. Later, however, when he goes to school, he goes through a period of resentment and believes that someone must be to blame for his situation. During this stage, the child sometimes resents any attempted assistance, and he will fight if anyone tries to help him. I know of an 8-year-old with a tetralogy of Fallot and cyanosis since birth, whose resentment against help takes the form of striking back at any attempts to aid her to the point of complete exhaustion.

After the stage of resentment comes resignation which, in itself, is fraught with trouble because the patients either become introverted and recessive in their acceptance of society and its obligations, or they take the opposite attitude. They believe life has been unfair and become antisocial. These children become severe behavior problems. Some children take the attitude that in spite of the defect they are going to keep up and surpass the other children and they take an active part in athletics and school activities to the point of serious, harmful effects. The pediatrician finds such an attitude difficult to cope with because it is understandable. Consequently, sympathy and a bond of personal relationship between the pediatrician and the child at this time is of greatest importance. Out of all these reactions finally comes the time of cooperation with the doctors and hope for the future. The patient can then be told and assured that the medical profession is overcoming the obstacles and eventually he will be able to live a happy and reasonably normal life.

EPILEPSY in children is effectively treated with bromide, which is economical and has a wide margin of safety. With blood-bromide concentrations of 14.5 to 24.3 mEq. per liter, Samuel Livingston, M.D., and Paul H. Pearson, M.D., of Johns Hopkins University and Hospital observe only occasional drowsiness. no acneform eruptions in preadolescent children, and none of the psychotic or neurologic disturbances manifested by adults. Among 196 subjects with seizures associated with severe organic brain lesions, complete control was obtained in 31 per cent and pronounced improvement in 20 per cent; most of these patients had not been benefited by the anticonvulsant drugs. The preparation used consists of 40 gm. each of ammonium, potassium, and sodium bromide, 3 cc. of amaranth solution, and compound benzaldehyde elixir to make 1,000 cc., yielding 0.6 gm. of total bromides to a teaspoonful. The dosage varies from 0.3 gm. twice to 0.6 gm. three times a day for children less than 6 years old and 0.3 gm. to 1 gm. three times daily for patients who are over 6 years of age.

Samuel Livingston and Paul H. Pearson: Am. J. Dis. Child. 86:717-720, 1953.

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# News Briefs . . .

# North Dakota

Dedication ceremonics for the new Wishek Community Hospital were held recently. Cost of the building was \$250,000. Of this amount, citizens of the community contributed \$133,750. The building contains 16 beds and has provisions for additional beds. A modern air-conditioning system has been installed. The hospital began operation April 1.

NORTH DAKOTA's cancer caravan recently completed a tour of the state for the fourth consecutive year. Dr. C. M. Lund is chairman of the caravan which is composed of a group of cancer specialists. This year an added feature was a mobile x-ray unit. Free chest x-rays were available to any person over 14 years of age.

The first of three immunization clinics opened recently in Tower City. Children of all ages were offered immunization against diphtheria, tetanus, whooping cough, and smallpox.

DR. CHARLES C. RAND was recently named superintendent of the state school at Grafton. He succeeds Dr. James Marr, who died in December. Since Dr. Marr's death, Dr. Rand has been chief of the school's medical staff and executive secretary for the institution.

Dr. Henry A. Norum, a specialist in general surgery, has joined the department of surgery at the Fargo Clinic. Previously Dr. Norum was associated with Drs. A. A. Zierold and D. J. Moos in Minneapolis.

Dr. Daniel Mergens, who is finishing hospital training at St. John's Hospital in Fargo, will enter general practice in Hillsboro July 1. He will be affiliated with the McLean Clinic.

# Minnesota

A University of Minnesota campus structure, known as the Anatomy building for forty-two years, has been redesignated Jackson Hall by order of the university's regents. The hall was named for the late Dr. Clarence M. Jackson, who became head of the anatomy department in 1913. Announcement of the change was made by Dr. Harold S. Diehl preceding the Clarence Jackson lecture.

The Hamm Foundation has made a grant to St. John's University, Collegeville, to assist the university in financing a pastoral psychology workshop. A project of the university's mental health institute, the workshop is intended to orient clergymen of all faiths in the fundamentals of mental health procedures.

CANCER RESEARCH awards were recently granted to four University of Minnesota faculty members and one staff member of St. Mary's College, Winona. Dr. J. J. Bittner, professor of cancer biology, received \$10,000; Dr. Helmut R. Gutmann, assistant professor of physiological chemistry, \$4,000; Dr. C. P. Barnum, associate professor of physiological chemistry, \$15,000; Dr. K. W. Stenstrom, director of radiation therapy, \$6,220; and Brother George Pahl, professor of zoology at St. Mary's, \$3,500.

Dr. Dale Cameron, a medical consultant for the United States Public Health Service, has accepted appointment as medical director for the Minnesota Department of Public Welfare. Dr. Cameron will become the state's highest paid public official at a yearly salary of \$18,000.

Dr. John Carroll, of Montevideo, will establish a medical practice in Winsted early in May. This move is good news to residents of Winsted and surrounding areas since the town has been without a physician for more than a year.

Dr. H. N. Sutherland, who has been associated with the Shipman Hospital and Clinic in Ely for more than forty-one years, recently retired from active practice. He continues to serve as city health officer and county coroner.

Dr. Arthur N. Antonow has joined the East Range Clinic in Ely as obstetrician and gynecologist. Previously Dr. Antonow practiced in Highland Park, Illinois.

New enlarged offices have been opened in the Medical Arts Building, Minneapolis, by Drs. Walter H. Ude, C. N. Borman, and Eugene E. Ahern, diplomates of the American Board of Radiology. They will continue to maintain offices in the LaSalle Building.

# Deaths . . .

Dr. Arthur A. Nichols, 69, city health officer and physician in Fargo, North Dakota, for nearly fifty years, died March 29. Though ill for some time, his death came unexpectedly.

Dr. John F. Timm, 86, pioneer North Dakota physician, died in a Minot nursing home March 23. Dr. Timm practiced in Makoti for fifty years before retiring in 1945.

Dr. Anton G. Wethall, 81, a Minneapolis physician for fifty years, died April 4. He has served the staffs of Deaconess, St. Andrews, and Mt. Sinai hospitals.

# ABNORMAL PULMONARY VENTILATION (Continued from page 178)

fluids. This child is 18 months old today and healthy.

7. Thoracotomy. Last but not least, any infant in whom all the above methods of saving and prolonging life have been used apparently without avail should be given the benefit of thoracotomy.

### SUMMARY

We, as physicians, need to be stimulated to do something constructive about the appalling number of infants who die each year from abnormal pulmonary ventilation. In as few words as possible I have tried to state the problem, describe some of its complexities, and list the best methods available to date for its prevention and treatment.

Much of the material in this paper is taken from the very stimulating and constructive study *Progress in the Prevention of Needless Neonatal Deaths* by Bundesen and associates.



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# The Value of Iron Therapy in Pregnancy\*

ROY G. HOLLY, M.D. Minneapolis, Minnesota

NEMIA is rarely a serious problem in obstet-A rics, yet the frequency of its occurrence and its association with other complications make it an important problem. Much has been written in the past about blood cellular changes in pregnancy so that physiologic, primary, and secondary anemia are common concepts in our minds, though often vague in meaning. Recent interest in all phases of hematologic investigation has produced technics which can be easily applied to a clinical study of anemia in pregnancy. Specifically, the bone marrow biopsy and procedures for determining the serum iron and erythrocyte protoporphyrin when applied to series of pregnant patients with and without anemia have provided useful information. The purpose of this paper is to present the details of investigations in which serum iron and erythrocyte protoporphyrin determinations have been used to evaluate blood changes in normal pregnancy, to evaluate the results of oral iron therapy in normal pregnancy and to assess the value of oral and intravenous iron therapy in pregnant patients with iron deficiency anemia.

# SIGNIFICANCE OF SERUM 1RON AND ERYTHRO-CYTE PROTOPORPHYRIN

Normal female values for hemoglobin, hematocrit, serum iron, and erythrocyte protoporphyrin are shown in table I. Serum iron is transport iron. Though the range of normal values is wide, a value below 60-gamma per cent is rarely found except under conditions of iron deficiency. High normal values of 160 to 200-gamma per cent are found in patients with hemolytic and aplastic

ROY G. HOLLY, associate professor of obstetrics and gynecology at the University of Minnesota, has been appointed professor of obstetrics and gynecology at the University of Nebraska.

TABLE 1 NORMAL HEMATOLOGIC VALUES FOR FEMALES

	Hemoglobin gm. %	Hematocrit %	Serum iron gamma %	E.P.° gamma %
Mean	13.4	41.5	103	42.7
Minimum	11.6	37.5	64	23
Maximum	15.9	47.0	192	67

°Erythrocyte protoporphyrin

anemia and in association with some liver diseases. Serum iron levels above 200-gamma per cent have been described in association with various megaloblastic anemias and with hemochromatosis. The significant importance of the serum-iron determination is that with few exceptions a low value is pathognomonic of iron deficiency.

The determination of the erythrocyte protoporphyrin is a measure of "free" or unbound protoporphyrin within the erythrocyte. Heme is the iron-protoporphyrin complex in hemoglobin. Under normal conditions a small amount of unbound and measurable protoporphyrin exists. Normal protoporphyrin range is from 20 to 60-gamma per cent. If there is insufficient iron to form heme, the amount of measurable protoporphyrin increases. Values above 60-gamma per cent can be considered as an indication of iron deficiency. Exceptions to this include heavy metal poisoning, chronic infection states, and conditions in which bone marrow function is significantly accelerated such as in hemolytic anemia.

# CHANGES IN HEMOGLOBIN AND HEMATOCRIT IN NORMAL PREGNANCY WITHOUT IRON TREATMENT

A decrease in the hemoglobin and hematocrit during pregnancy has been well documented in

<sup>\*</sup>Presented at the North Dakota Obstetrical and Gynecological Society, September 19, 1953.

Month	3	4	5	6	7	8	9	Post- partum
Mean hemoglobin, gm. per cent	13.2	12.0	12.1	12.2	12.1	11.9	12.3	12.7
Mean hematocrit, per cent	40.6	37.0	34.8	36.0	36.0	36.4	37.5	38.7
Mean serum iron, gamma per cent	112	80	119	93	85	63	74	76
Minimum serum iron, gamma per cent	60	61	79	40	30	23	25	30
Mean erythrocyte protoporphyrin, gamma per cent	47	46	45	43	38.5	49	58	65
Maximum erythrocyte protoporphyrin, gamma per cent	52	59	58	66	78	101	96	138

the literature. Table 2 shows mean values for hemoglobin and hematocrit for each month of pregnancy and the puerperium. These data were obtained from the study of 102 pregnant women, 22 of whom were serially studied. Single determinations were made on 80 women in the last trimester of pregnancy. Mean values for each of these determinations show a gradual decrease. Low normal values are present in the last trimester.

Serum iron and erythrocyte protoporphyrin determinations were also carried out on this group of pregnant women. Mean values for each of these determinations are shown in table 2. Late in pregnancy many of these values fall outside the normal range so the minimum serum iron and maximum protoporphyrin values for each month are also indicated. The mean scrum iron level is significantly decreased late in pregnancy. The mean protoporphyrin is increased in the last month.

In summary, a decrease in the mean hemoglobin and hematocrit is found in late pregnancy when determined on a group of healthy women. There is a concomitant decrease in the mean serum iron and increase in the mean erythrocyte protoporphyrin. Since these changes are indicative of iron deficiency, they suggest that the decrease in hemoglobin and hematocrit during pregnancy is the result of an iron deficiency.

Are the results observed in a group of patients in whom mean values are calculated applicable to the individual? To assess the individual changes, a correlation has been made between each hemoglobin value and the corresponding serum iron and erythrocyte protoporphyrin. Not all of the patients show decreases in hemoglobin and hematocrit during pregnancy. Some show only minimal drops, while, in others, anemia becomes more pronounced. The hemoglobin-serum iron-erythrocyte protoporphyrin correlation is shown in table 3. Those pregnant patients who were found to maintain normal hemoglobin levels had normal serum iron and erythrocyte protoporphyrin values. Those patients whose hemoglobin level decreased to below 12-gm. per

cent clearly had an iron deficiency. The more pronounced the decrease in hemoglobin and hematocrit, the more significant were the changes in serum iron and erythrocyte protoporphyrin.

TABLE 3
COMPARISON OF HEMOGLOBIN LEVEL LATE IN PREGNANCY WITH SERUM IRON AND ERYTHROCYTE
PROTOPORPHYRIN

Hemoglobin gm. %	Mean serum iron gamma %	Mean erythrocyte protoporphyrin gamma %
13+	92	43
12-13	80	48
11-12	65	55
10-11	42	74
<10	29	124

Observations on 88 patients with hemoglobin levels below 10-gm. per cent are included. In these patients, the cyclence for iron deficiency was most striking. This study of pregnant patients who were not given supplemental iron indicates that a state of iron deficiency exists when the hemoglobin falls below 12-gm. per cent.

How many pregnant women become iron deficient and anemic during pregnancy? A second study of 55 women has been carried out to determine the frequency of iron deficiency in pregnancy. All of the 55 women had normal pregnancies. None received iron therapy. Of the 55 patients, 6 or 23.6 per cent were found to have decreased their hemoglobin to less than 10-gm. per cent by the thirty-sixth to thirty-ninth week of gestation. A minimal decrease in hemoglobin

TABLE 4
Untreated Series (55)
COMPARISON OF HEMOGLOBIN AT 3 TO 6 MONTHS OF PREGNANCY WITH PREDELIVERY DETERMINATION

Hemoglobin gm. %	Number patients 3 to 6 months	Number patients predelivery
9-9.9	0	6
10-10.9	5	17
11-11.9	15	13
12-12.9	20	13
13+	15	6

Maintained bemoglobin, 21.8 per cent Moderate decrease, 54.6 per cent Pronounced decrease, 23.6 per cent to between 10- and 12-gm. per cent was found in 54.6 per cent of the group. Only 21.8 per cent were found to maintain normal hemoglobin values throughout pregnancy. These findings are shown in table 4. The number of patients at various hemoglobin levels in early pregnancy is compared with the number at each level just prior to delivery. The pregnancy decrease in hemoglobin is clearly indicated by the increase in the number of patients in lower hemoglobin brackets in late pregnancy.

# EFFECT OF ORAL IRON ON HEMOGLOBIN AND HEMATOCRIT IN NORMAL PREGNANCY

If nearly 80 per cent of untreated pregnant women manifest some degree of iron deficiency and hemoglobin decrease, the logical assumption is that the addition of an iron supplement should prevent these changes. This assumption presup-

TABLE 5
Ferrous Sulfate Series (32)
COMPARISON OF HEMOGLOBIN AT 3 TO 6 MONTHS OF PREGNANCY WITH PREDELIVERY DETERMINATION

Hemoglobin gm. %	Number patients 3 to 6 months	Number patients predelivery
9-9.9	0	0
10-10.9	2	0
11-11.9	9	5
12-12.9	11	12
13+	10	15

Maintained hemoglobin, 75 per cent Moderate decrease, 25 per cent Pronounced decrease, 0 per cent

TABLE 6
Ferrous Gluconate Series (40)
COMPARISON OF HEMOGLOBIN AT 3 TO 6 MONTHS OF PREGNANCY WITH PREDELIVERY DETERMINATION

Hemoglobin gm. %	Number patients 3 to 6 months	Number patients predelivery
9-9.9	0	0
10-10.9	3	0
11-11.9	10	4
12-12.9	19	14
13+	8	22

Maintained hemoglobin, 80 per cent Moderate decrease, 20 per cent Pronounced decrease, 0 per cent

TABLE 7
Mol-iron Series (22)
COMPARISON OF HEMOGLOBIN AT 3 TO 6 MONTHS OF
PREGNANCY WITH PREDELIVERY DETERMINATION

Hemoglobin gm. %	Number patients 3 to 6 months	Number patients predelivery
9-9.9	0	0
10-10.9	4	1
11-11.9	7	6
12-12.9	8	6
13+	3	9

Maintained hemoglobin, 81.8 per cent Moderate decrease, 18.2 per cent Pronounced decrease, 0 per cent

TABLE 8

Total Iron Treated Series (94)

COMPARISON OF HEMOGLOBIN AT 3 TO 6 MONTHS OF PREGNANCY WITH PREDELIVERY DETERMINATION

Hemoglobin gm. %	Number patients 3 to 6 months	Number patients predelivery
9-9.9	0	0
10-10.9	9	1
11-11.9	26	15
12-12.9	38	32
13+	21	46

Maintained hemoglobin, 78.7 per cent Moderate decrease, 21.3 per cent Pronounced decrease, 0 per cent

poses that bone marrow function is normal and that the administered iron salt is taken and absorbed. Up to this time studies have been completed on 94 pregnant women who were given an adequate trial of oral iron. Ferrous sulfate, ferrous gluconate, and Mol-iron have been used. The uniformly good results from each of the iron salts are shown in tables 5, 6, and 7. The results of therapy in the total group of iron-treated patients are shown in table 8.

Instead of nearly 80 per cent of patients showing a decrease in hemoglobin during pregnancy, about 80 per cent given supplemental iron maintained or improved their hemoglobin level. Only 1 patient treated with iron delivered with a hemoglobin below 11-gm. per cent. Whether the 20 per cent of patients who failed to respond completely to the administered iron did not absorb it or actually did not take it as prescribed could not be determined from the study. Each iron salt was given to roughly comparable groups. Each was given for approximately the same length of time, so it is assumed that the trial on each iron salt was the same. No particular advantage of one tested iron preparation over another was noted.

There were 22 patients who received Mol-iron for at least 90 days prior to the predelivery hemoglobin determination. The daily dose was 5 gr. three times a day. Of these patients, 81.8 per cent maintained their initial hemoglobin level or the hemoglobin was increased just before delivery. Response to Mol-iron medication failed completely in 1 patient. Ferrous gluconate was administered to 40 patients and 32 received ferrous sulfate. The divided daily dose of each salt was 1 gm. Of the patients in these series, 80 and 75 per cent respectively maintained or improved their hemoglobin values on oral iron. The better results in treated patients over those patients who had not been treated is shown in the larger number of patients in the higher hemoglobin brackets at the time of delivery. Nearly 20 per cent of the patients did not respond

completely to orally administered iron. They may not have taken the prescribed tablet. They may have failed to absorb or utilize the administered iron. Possibly the bone marrow was functionally ineapable of additional hemoglobin synthesis. Considerable interest in cobalt as a bone marrow stimulant has been aroused by reports that it is effective in treating some hypoplastic and aplastic anemias. An iron-cobalt preparation, Roncovite, has been tried on an additional series of 42 pregnant patients. Patients were given 1 gm, of iron, but in addition received from 45 to 90 mg, of cobalt chloride. Of the 42 patients, 41 maintained or improved their hemoglobin status. The improved results with iron and cobalt could be significant. Further studies are in progress at this time.

# IS THERE A PHYSIOLOGIC ANEMIA IN PREGNANCY?

Physiologic anemia has come by popular usage to refer to moderate decreases in hemoglobin during pregnancy. Because of the known increase in plasma volume during pregnancy, many investigators have suggested that a hemodilution occurs. This concept has been used to explain the so-called physiologic anemia in pregnancy. The gradual increase in plasma volume should not produce an anemia, provided that ample iron exists for hemoglobin formation. The bone marrow has an enormous potential for new hemoglobin formation. From the available evidence, anemia occurs in pregnancy because of iron deficiency, not because of a plasma volume increase. Associated with decreases in hemoglobin and hematocrit during pregnancy are concomitant decreases in serum iron and increases in erythrocyte protoporphyrin. Equally convincing is the fact that the addition of iron to the patient's diet results in maintenance of normal hematologic values. Anemia in pregnancy is not "physiologic." It is usually the result of an iron deficiency.

#### IRON DEFICIENCY ANEMIA IN PREGNANCY

The usual description of iron deficiency anemia fits only the patient with a long standing or chronic iron deficiency state. An anemia severe enough to produce the classic symptoms and signs of iron deficiency is rarely scen in pregnancy. The diagnosis of the anemia is often difficult because, with minimal to moderate decreases in hemoglobin, changes in the peripheral blood are rarely sufficient to recognize iron deficiency. Typical iron deficiency anemia has been studied in 88 pregnant patients. Hemoglobin levels were below 10-gm. per cent in all patients. Only 19 of the 88 patients had a re-

duced mean corpuscular diameter, low cell indices, or blood smears clearly indicative of iron deficiency. Unless facilities are available for accurate study, the assumption should be made that any reduction in hemoglobin in pregnancy is the result of iron deficiency. Further studies should be instituted if the anemia does not respond to iron or if the hemoglobin drop is pronounced and sudden. Under these circumstances a hypoplastic or megaloblastic anemia should be suspected. Occasionally a patient is seen who does not respond to oral iron, though iron deficient. These patients will respond to intravenous iron administration.

Most pregnant patients with iron deficiency anemia respond to oral iron therapy. The response is slow. A pronounced reticulocytosis never occurs. Studies have shown that only 4 to 5 mg. of iron can be absorbed daily by the anemic patient. This is less than the optimal amount of required iron and accounts for the suboptimal response by the bone marrow. While under oral iron therapy, 29 patients with iron deficiency anemia in pregnancy were carefully followed. The maximum reticulocyte response in any patient was 7.7 per cent. The daily mean hemoglobin increase was 0.06-gm, per cent. The daily dose of ferrous iron was 0.5 to 1 gm. Because of the "mucosal block" to iron absorption and because of gastrointestinal irritation from large single doses, the preferred method of administration is to divide the total daily dose. Only ferrous iron is absorbed by human beings. There is no suggestion that vitamins, folic acid, or vitamin B<sub>12</sub> increase the absorption or utilization of iron.

A serious defect in most therapeutic regimes is to administer oral iron until the hemoglobin has returned to normal. This does not take into account the replacement of iron stores which does not occur until hemoglobin regeneration is complete. Iron therapy should aim at not only restoring a normal hemoglobin but at replacement of the reserves. Assuming a maximum daily absorption of 5 mg., oral iron therapy should be continued for a minimum of two hundred days after the hemoglobin is normal. Iron deficiency anemia implies complete absence of iron stores. Therapy for the anemia should be prolonged to correct the anemia and to replenish iron stores.

A safe and effective intravenous iron is now available for use. Intravenous iron is not a panacea for all anemias and should be used carefully and only when iron deficiency exists. Indications for its use include conditions in which iron deficiency exists and (1) where oral iron

(Continued on page 244)

# Trends in Natural Childbirth

SOL T. DE LEE, M.D. Chicago, Illinois

In RECENT years, interest in the timeless subject of childbirth has increased. Because of the many articles currently published in medical and lay magazines, and due to public demand, more physicians have been compelled to give consideration to natural childbirth.

Obstetricians are particularly interested in anesthesia, because not only the mother's condition but also the baby's is a primary consideration. If analgesics and anesthetics affected the mother only, the problem would be simplified. However, safe elimination of all pain of labor without some hazard to the baby is almost impossible. Lack of a perfect anesthetic agent and the immediate popularity of new technics of anesthesia, especially among the childbearing public, makes one smile rather wryly at the recent demand for "natural childbirth."

The purpose of this paper is to appraise and discuss natural childbirth as practiced by the author in a selected group of private patients. Natural childbirth has far reaching implications, certainly more than the subject of anesthesia alone. It implies education, training, and psychologic conditioning of the expectant mother to all phases of pregnancy, labor, and the postpartum period. Natural childbirth renders these phases of procreation safer, richer, and more meaningful experiences, though the latest advances in obstetrics are not sacrificed.

In 1909, J. B. DeLee¹ wrote: "While the cave women and Mrs. Pithecanthropus Erectus (about 500,000 years ago) may have had no more pain in labor than the animals among which they fought for existence, modern woman suffers greatly during the process. This is the result of civilization . . . . "

This is the thesis upon which Read<sup>2,3</sup> evolved his theories concerning natural childbirth. He states that "Civilization and culture have brought influences to bear upon the minds of women which have introduced justifiable fears and anxieties concerning labor."

Read's theory is meeting with enthusiasm by

SOL T. DE LEE, a 1937 graduate of the University of Chicago, The School of Medicine, is assistant clinical professor of the department of obstetrics, University of Illinois College of Medicine, Chicago.

large groups and is being critically reviewed by others. Those interested in the specific theories and method set forth by Read are referred to his volumes *Natural Childbirth*, and *Childbirth Without Fear*.

The patients in my series demonstrated the following: Interest in the subject of natural childbirth must be spontaneous; it is never suggested. The patient approaches the doctor and requests natural childbirth. She is convinced that this is the delivery she wants, and she is likely to succeed in a method of delivery of her own selection. A high percentage of failures can be expected if the Read method is tried at random. This is because the method is associated with many obstacles, including the time and effort necessary to properly prepare and train the patient plus the realization that pain is often present.

The women in this series are private patients with average incomes, usually well educated, sometimes possessing above average intelligence. In most cases they have read rather extensively on natural childbirth. They are so well versed that they ask pertinent questions at their first visit and usually are anxious to begin classes and exercises.

#### INDICATIONS AND CONTRAINDICATIONS

When evaluating the indications for natural childbirth, the fact that this is a technic selected by the patient should be remembered.

The literature and personal communications reveal that certain psychologic benefits are derived by some mothers. Natural childbirth is not psychologically helpful to all patients. The question whether natural childbirth should be chosen for all patients who presumably can use the emotional boost received by some successful patients is debatable. Mothers who have had successful deliveries, wherein active participation and consciousness were present, express a feeling of accomplishment as well as exhilaration and elation. What effect this emotion has on a woman's psyche is still a moot question. Helene Deutsch<sup>4</sup> believes that mothers do derive some definite psychologic benefits.

Some medical conditions interdict Read's method. For example, bearing down during the

second stage of labor is prohibited for the cardiac, tuberculons, or debilitated patient.

In my opinion, the method should not be advocated for the patient who has an antipathy toward natural childbirth or any of its phases. Failure in such a case is almost a certainty. Profound disappointment can have an adverse psychologic effect, perhaps not as great in a patient who was persuaded to attempt natural childbirth as in one who requested it. Benedek<sup>5</sup> states that such failure can give a woman a feeling of frustration and even guilt. Therefore, this possibility must be considered in the selection of patients.

#### PREPARATION OF PATIENTS

Preparation of the patient includes education of the patient and her husband, plus physical training and emotional preparation of the patient. First, several books are suggested which are inexpensive and available at the library. They include: (1) A Way to Natural Childbirth—Helen Heardman; (2) Natural Childbirth—Goodrich; (3) Childbirth Without Fear—Read; (4) You Must Relax—Jacobson; and (5) Training for Natural Childbirth—Thoms.

Regular classes are held for the patients. Because of the time involved, an experienced nurse conducts the classes. She is familiar with the contents of the pertinent books and possesses a knowledge of the physiology, anatomy, and psychology of pregnancy and labor. She discusses the various aspects of the subject and answers questions.

At these classes, the exact performance of the necessary exercises are clarified and practiced until they are understood and mastered. Various relaxation technics are also stressed, and these constitute a far more important factor for success than the exercises. Occasionally patients who have had successful labors with natural childbirth speak to a prenatal group, relate their experiences and explain what it has meant to them. Essentially group psychotherapy, the confidence and understanding of the group are enhanced in this way. At other meetings a pediatrician meets the patients and discusses and answers questions on many aspects of the newborn.

A motion picture of a normal delivery is shown. The movie depicts the physiology and anatomy of the various stages of labor. Husband and wife attend, and after every showing the different aspects of labor are discussed.

Deep-rooted anxieties, fears, and superstitions are difficult to break down with any type of superficial psychotherapy. Therefore, emotional preparation of the patient often presents a prob-

lem. A strong doctor-patient relationship is established during routine office visits. Effort devoted to allaying individual apprehensions and misbeliefs, often the basis for fear, can, as a rule, adequately prepare the patient for a relatively painless delivery.

#### MANAGEMENT OF LABOR

Success or failure of the Read method depends largely upon the support given the patient during her labor, regardless of time and effort spent prenatally. Therefore, several basic principles essential for success are always utilized. The patient's physical and emotional status must be determined long before the calculated date of confinement. Knowledge that all is well gives the parturient confidence and assurance that a normal labor is to be expected, and that her mind and body can bear the strain and discomfort that lie ahead.

Read and his disciples emphasize the importance of not leaving the patient alone during labor. Hysterical reactions often occur when this policy is not followed. Although it is sometimes impractical for me to be with the patient throughout the entire first stage of labor, a nurse, intern, and husband compose a good team to lend necessary support and guidance. Their presence alone is comforting; they give encouragement, keep the patient well hydrated, rub her back, see that the bladder is empty, and that she remains clean and dry. The nurse, in particular, reviews the various relaxation technics, breathing exercises, and positions.

During early labor the patient is examined at intervals. At this time another important method of morale boosting is employed. The physiology and anatomy of labor are recalled, and the baby's position is explained during the course of labor. The patient is told of the progress of the head and the thinning and dilatation of the cervix. When possible, the estimated time of delivery is made. An optimistic view toward a speedy termination is usually psychologically helpful.

I see my patients early in and at intervals during the first stage, and I stay with them toward the end of this phase until labor is terminated. Thus, further rapport is established, and the assurance of the physician's availability gives added confidence. This confidence has been needed in many cases, for the greatest degree of discomfort has been noted during the last part of the first stage. Here is the real test of the patient's ability to continue, proof of her ability to relax, and the efficacy of her training. Descent of the head and stretching of the tense cervix require all of the patient's past condi-

tioning. The art and help of the physicians or nurses (sacral back-rubbing here is paramount) is necessary in order for patients to pass beyond

this crucial phase.

The second stage seems easier because the end is in sight. The mother now has a sudden and real awareness of her purpose. We, as attendants, also have the satisfaction of having accomplished ours. Contractions of the second stage generally are longer and more frequent. Perhaps, due to the effort by the patient and anticipation of the big moment at hand, the contractions do not seem to upset most patients. Strangely, almost all of our patients sleep well between these powerful contractions. Frequently amnesia of variable degree occurs (sometimes complete) up to the time of actual delivery, regardless of whether or not medication is administered.

Now we come to the delivery. Toward the onset of the second stage the patient is allowed to remain in the labor room with her husband. When she is bearing down effectively and has brought the head low in the pelvis, she is taken to the delivery room. When bulging occurs, the legs are placed in stirrups, and the patient is prepared, draped, and catheterized. Episiotomy is usually necessary, and is performed under Novocain anesthesia at the peak of the patient's expulsive effort.

During actual delivery, two moments of extreme discomfort are generally experienced. The first occurs when the widest diameter of the head passes through the outlet, and, second, when the shoulders pass through. Extreme distention is nearly always felt reflexly as pain. This causes a further bearing down effort which is easily prevented by instructing the mother to pant. This restrains the perineal reflex, thus allowing a slower passage and more artful delivery. The placenta is generally delivered spontaneously or by simple expression. A reward for the obstetricians' extra hours of effort and time, so necessary for this group, is to hear the immediate spontaneous cry of the newborn. Necessity for resuscitation in this series was almost nonexistent, consistent with all previous reports.

Realization of a job well done is now brought to the patient's full consciousness by the appearance and sound of the baby. This unique experience gives the mother her first sensations of uninhibited joy. Euphoria is common, although it is a rational type, and soon develops into a pleasant feeling of well-being rather than an overwhelming type of elation.

Time and energy consumed in giving patients

natural childbirth is well spent. Granting the patient's wishes for a natural delivery without sacrificing the benefits of modern obstetrics is harmless cooperation, and often psychologically helpful. Considerable evidence supports the theory that a spontaneous, natural delivery is safest and best for both mother and baby.

#### RESULTS

Evaluation of this author's series of cases resolves itself into: (1) Interpretation of obstetric results. (2) Objective appraisal of the patient's response to pregnancy and labor. (3) Subjective reaction of each patient to her own labor experience.

Obstetric results. Of the 143 patients in this series, 79 were primiparas and 64 multiparas. Of the 143 patients, 65 per cent attended relaxation classes. The others were either multiparous women, or for some reason were not able to participate in this physical and psychologic preparation for the oncoming labor.

The age distribution was: primiparas between 18 and 38 years; multiparas between 22 and 44

years.

The mean values as to total labor hours—third stage inclusive—were: ten hours forty-seven minutes for primiparas; six hours forty-six minutes for multiparas. It is interesting that the second stage averaged fifty-one minutes in primiparas and twenty-five minutes in multiparas, if we keep in mind that 40 of the delivered babies weighed more than 3,400 gm. The majority weighed around 4,000 gm. The average weight for all babies of primiparas was 3,142 gm.; of multiparas 3,210 gm. This weight includes the 1,500-gm. premature, previable baby as well as the 4,555-gm. baby born to a secundipara, who also had her first baby with natural childbirth.

In primiparas, blood loss varied between 75 cc. and 350 cc.; in multiparas between 50 cc. and 350 cc.

There were 3 premature, previable babies in the series. They caused no particular trouble, except 1 whose mother had the only postpartum hemorrhage. There was 1 hydrocephalic. There was 1 case of prolapsed cord along the presenting head. Immediate forceps delivery prevented any further complication.

There was 1 postpartum hemorrhage with 700 cc. blood loss, 1 abruptio placenta, 2 uterine inertias, and 2 prolonged labors. However, all patients, with the exception of the cesarean section, left the hospital within ten days and no late complications were observed. Inertias and prolonged labors were the cause of 3 mid-forceps deliveries. These babies weighed more

than the average; namely 3,870, 4,230, and 4,320 gm.

TABLE 1
TYPE OF DELIVERIES AND LACERATIONS

	Spontaneous	Spontaneous with episiotomy	Episiotomy with forceps
	<u>° 2</u>	001	
Primiparas	9	4.1	25
	*8		
Multiparas	18	41	5
Total	27	85	30

º 1-2 Perineal tear

°° Cervical laceration

The above figures are self explanatory. More than half of this series of patients delivered spontaneously with episiotomy. There were 9 perineal lacerations in the entirely spontaneous group, in contrast to 1 cervical laceration in the spontaneous with episiotomy group, and none in the third group. We will reconsider these data in discussing the whole concept of the method.

There was 1 cesarean section for cephalopelvic disproportion. Delivery from above was considered as less traumatic and more advantageous for both mother and baby.

There were 2 sets of twins in our series. All of the babies were spontaneously delivered.

There were 2 breech deliveries, 1 in.a primipara, the other in a multipara. Both delivered spontaneously with Novocain infiltration and episiotomy.

TABLE 2
ANALGESIA DURING THE FIRST STAGE

	Barbiturates	Demerol or morphine	Gas with pain	None
Primiparas	13.3%	22%	2.2%	62.5%
Multiparas	2.9%	5.8%	11.7%	79.6%

Table 2 shows that somewhat more than onethird of all primiparas received 1 of the above analgesic agents. This important point will be discussed later.

TABLE 3
ANESTHESIA FOR DELIVERY

	Novocain infiltration	Inhalation anesthesia	Saddle block	Nothing
Primiparas	84.6%	8.8%	6.6%	0
Multiparas	. 74%	17.5%	0	8.5%

The great majority of the patients were delivered under local anesthesia, using one-half per cent Novocain-Adrenalin solution. A few were delivered either under inhalation or saddle block anesthesia. Less than 10 per cent were delivered without any type of anesthesia.

Patient's response to pregnancy and labor. Observations made during this study concur generally with reports of similar groups. (1) Patients educated for natural childbirth were better prepared for labor and all eventualities. (2) The confident, determined, well relaxed patient usually enjoyed complete success. (3) The author's patients in labor were not left alone. The attention of experienced personnel during this period greatly enhanced the morale. (4) The elation period immediately postpartum was consistently present.

Patient's impressions. Unquestionably these patients have a real feeling of accomplishment and deep sense of satisfaction and gratification. In no instance in the author's series, if a patient received minimal or no analgesia or anesthesia and actively participated in her delivery, did she regret having completed her labor with this method. Contrarily, when a patient voluntarily deviated completely from the original plan or instrumental delivery was indicated, she expressed regret and disappointment. This group almost unanimously looked forward to the next labor as a chance to experience a completely natural delivery. Emphasis should be made, however, that patients should be intelligently prepared during their prenatal period, that the final termination of labor should not be directed purely by the desire for a noninstrumental delivery, and that the physician might change the plans if the interest of the patient or the baby so demands. Thus, the feeling of frustration will be greatly ameliorated or even eliminated.

# PSYCHOSOMATIC ASPECTS

From the standpoint of psychosomatic aspects of natural childbirth, the subject of whether the Read method is hypnosis is controversial and exhaustive. Read vehemently denies that his method is hypnosis, yet he describes his patients as being in a trance-like state during the end of the second stage of labor, not dissimilar to a waking hypnosis.

Clinical psychologists define natural childbirth and suggestive relaxation as exaggerated suggestibility induced by artificial means. Mandy,<sup>6</sup> in his work at the Sinai Hospital in Baltimore, was able to induce complete anesthesia sufficiently deep to introduce a trocar in a patient's extremity. Read describes this as a simple relaxation technic. Mandy states that he and his associates call it hypnosis and believe that relaxation exercises and suggestion are merely modifications of hypnosis. My very limited observations<sup>7</sup> on the use of hypnosis in obstetrics coincide with those of Mandy.

# CRITICISM OF READ'S TEACHING

Those of us who know Read personally and have heard him lecture, cannot question his sincerity either of intent or observations. On the other hand, his overzealousness for a "back to nature" movement has now boomeranged, and in my opinion several aspects of his thesis must be either accepted with caution or repudiated altogether.

Specifically, the following quotations of Read are not in accord with our present day obstetric

thought and teaching:

"There is no physiological function in the body which gives rise to pain in the normal course of health." Not only healthy humans, but lower forms of animals, in many instances, experience pain during the physiologic process of parturition. "Modern science has laid down the smoke screen of anesthesia in order to hide its own lack of perception. Anesthesia essentially converts a normal physiological process into a pathological state with its attendant risks." Anesthesia, used judiciously, demonstrates the advancement of science. Recent studies reveal that analgesia and anesthesia may be associated with the lowest fetal mortality rate. "If fear can be eliminated, pain will cease." There is no scientific proof that this is so. "All narcotic agents are injurious to babies during birth; they are all more or less severe respiratory depressants." This is contrary to the findings of scientific investigation. Used intelligently, narcotics are an important part of our obstetric armamentarium and analgesics are indispensable in a broad application of any natural childbirth program. "If a woman can relax well at that stage (the second stage), if she can be told that the sensation of bursting is a myth and that the head will not tear the perineum if she is relaxed, it is astonishing how large a baby will pass through what appears to be a small vulva without any tear to the perineum at all." It is better to do an episiotomy than have the mother suffer cystocele or rectocele in later years. Even though no lacerations are visible when a primipara delivers an average size baby without an episiotomy, separation of the muscles, mucosal tears, and fascial attenuation usually occur. Also, the fetal mortality rate rises in proportion to the length of the second stage beyond an hour and one-half, especially if the fetal head is pressing against a resistant perineum. A large baby can cause enough discomfort by interfering with the normal mechanism of labor and by delaying the labor, or by its size alone, to discourage patient or obstetrician from persisting in the original plan of delivery. This is particularly true in a

primipara, an observation not found in any of the literature reviewed. "No one who uses these methods must expect invariable success." There are women who will never learn control. . . . Analgesics and anesthetics are the correct treatment for such." Read's volume *Childbirth Without Fear* has been widely misinterpreted by the medical profession as well as by the laity to mean childbirth without pain. His foregoing statement proves his awareness that pain is a necessary component of some labors. Unfortunately many of Read's commitments are based on his personal feelings rather than facts, which lead to much misunderstanding.

Reid and Cohen<sup>9</sup> negate Read's theory and practice of natural childbirth. They prove convincingly that J. B. DeLee's statement, used in part as the foundation for Read's method, was not based on anything factual! These authors rebuke Read regarding his description of a natural delivery by saying, "This reintroduction of a method which women of earlier generations had to accept for obstetric care is not, in our opinion, compatible with the best interest

of either mother or child."

It is timely to criticize Read, for, as a pioneer in this method, his works are widely read and patients have been given some false impressions. After reading his books, patients usually look forward to a painless labor, for he emphasizes that this is very likely. He does mention that discomfort is present, though he minimizes the discomfort. When patients discover that labor is not altogether painless, disappointment is the result. Read unquestionably has banished fears of many sorts, but as a result has created others.

Patients often fear for the lives or welfare of their babies and themselves when a narcotic or anesthetic is required. Banishing fears of one kind and substituting others is most unfortunate. Therefore, the benefits of Read's teaching of natural childbirth, in some instances, is nullified by the production of false beliefs.

# COMMENT

"What is natural childbirth?" Read's method in its unadulterated form wherein the emotionally and physically prepared patient is carried through the 3 stages of labor without use of medication, anesthetics, or instruments, is natural childbirth. Since this is true, how can others who emulate him only in part also call their technic natural childbirth? This is confusing both to the layman and medical profession. In somes instances, there is a fine line between the natural childbirth of Read and that of his fol-

lowers, yet, in others, the resemblance is in name only. On the other hand, there is an almost universal consistency concerning the basic tenets of Read; namely, his attack on fear and tension and his doctrine of education. It is ludicrous to give a patient 100 mg. of Demerol during the first stage of labor, and a spinal anesthetic or ethylene for the second stage and then term the delivery natural childbirth. Yet Thoms<sup>10</sup> and Goodrich<sup>11</sup> have managed many of their patients in this exact manner and called it "natural childbirth."

In contrast to Read's dogmatisms, the attitude of Thoms and Goodrich is more practical. They are less conservative about the use of sedatives and anesthetics, admitting freely that patients vary as to their tolerance of pain, ability to learn to relax, and desire to retain full consciousness during all stages of labor.

Read deserves credit for his pioneer work. However, for the sake of clarity and other obvious reasons, unless the methods he teaches and practices are closely adhered to, his name should not be used to describe variations of and deviations from so-called natural childbirth.

The time when the patient actively participates in her delivery is also the time of greatest fetal loss and peril. Some of the factors which account for these tragedies are intimately related to reasons for modifying our intended approach and demand broad attention.

Hazards surrounding the fetus at or near the time of delivery have been reviewed by Andros<sup>12</sup> in a study of apneic infants delivered under "saddle block" spinal anesthesia. When, in his patients, pharmacologic narcosis had been eliminated, prolongation of the perineal stage and the entire second stage became the principal factors in causing delay in respiration at birth. Tucker<sup>13</sup> has shown that the perinatal mortality rate in uncomplicated spontaneous deliveries of first babies, managed in the home by trained personnel of the Chicago Maternity Center, is significantly higher than in deliveries managed by outlet or low forceps in a teaching hospital. This has been largely attributed to the relatively longer duration of the second stage - and its perineal component in particular — inherent in spontaneous primiparous home deliveries.

A second factor is the forceful and often violent character of the voluntary "bearing-down" efforts in a parturient, who has received a minimum of sedative medication, and who frequently lacks the self-control acquired from prenatal natural childbirth instruction. This effect has been emphasized by Hingson and associates,<sup>14</sup> who found the highest, and usually large, perinatal death rate among those infants born of mothers who received no anesthetic.

McKhann and associates<sup>15</sup> have incriminated undue forceful delay in delivery as the second etiologic factor, next to narcosis, in a large group of infants and children with brain damage dating from birth. The multiplicity of "obstetrie" accidents which may befall the infant during the "perineal" stage of labor have been enumerated by Harrar and Buchman.<sup>16</sup>

Obviously, from the foregoing, balance is necessary between the risk of the fetus from delay in the late second stage and desire of the patient and obstetrician to persist in the elected method of natural childbirth. The fact that success has been achieved to this point should not make one overzealous.

Obvious fetal distress is an absolute indication for *immediate* delivery. Likewise latent dangers exist which interdict prolongation of the late second ("perineal" or "near-perineal") stage of labor in any case, beyond a period of time which cannot be predicted in all labors, but which perhaps is best estimated at approximately thirty minutes.

These patients who are well prepared for any eventualities of labor will, or at least desire to accept the mental and physical stress. Some, however, fail to respond to the trying periods of labor and need both psychologic and pharmacologic support. This does not necessarily mean that the patient "failed" to pass the qualifications of "natural childbirth." In my series, onethird of the primiparas needed some analgesic agent; the same was true for the multiparas, up to twenty per cent. The fact must be considered that the pain-threshold might be changed due to increased uterine activity as well as to the relatively oversized passenger, particularly when descent of the presenting part is retarded, because of soft tissue resistance. The modern concept of obstetric practice should not be discarded for the sake of the method, nor should the method be regarded as unsuitable in these cases. The sharp differences must be abridged and, using the arsenal of obstetric analgesia, the patient should be given its benefits. The majority of patients, even though feeling they "failed" to some extent, appreciate the physician's interven-

These data, although numerically small, strikingly support the currently increasingly popular, long-advocated preventive obstetric practice. Undoubtedly, secondary pelvic relaxation is more likely to occur in women who, following an overdistention, suffer minor or major superficial and deep lacerations, than in those whose

obstetrician, recognizing the inescapable tearing, proceeds with preventive episiotomy under local or general anesthesia. Most patients, if intelligently prepared for this measure, do not resent the idea. It seems obvious that the Read method should be flexible in those instances, for the results justify the postulation that no sound obstetrics can be practiced rigidly adhering to a

hypothetic "spontaneity."

To the strict disciples of the Read method of natural childbirth, the use of forceps in one fifth of the author's cases (including 3 mid-forceps), might be open to critical inquiry. However, the rabid enthusiasm for the "natural" methods must come into conflict with current obstetric concepts of what constitutes the ultimate in safety for the fetus on the one hand, and the beneficiary practice of preventive obstetrics, as advocated by J. B. DeLee. Increasing evidence shows that undue prolongation of labor, or needless delay in delivery, is a major factor in intrapartum and neonatal mortality.

## SUMMARY AND CONCLUSIONS

Careful evaluation of 142 pregnancies and deliveries with natural childbirth shows that scientific psychology and obstetrics are compatible. The so-called "Read method" was applied with some modifications, which the author believes are necessitated when rabid adherence to theories means contradiction to accepted good obstetric practice. Using natural childbirth, as interpreted by me, to fulfill a patient's wishes and perhaps psychologic needs, is not compromising sound obstetrics.

But to follow unwaveringly the teachings of Read is not consistent with our present knowl-

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edge of obstetrics. However, great respect must be given to the basic idea of his theory. The present author strongly favors psychologic preparation of all patients, whether or not participation or consciousness are anticipated. The exact method employed or the name given is quite irrelevant. The fuller, more fruitful experience can be attained by utilizing whatever adjuncts we have at hand in a safe conservative manner analgesia, sedation, anesthesia, episiotomy, forceps, and so forth. These should be freely resorted to with the slightest indication. With this in mind, prepared patients can have a trend toward a fully natural delivery with complacency.

Bloss<sup>17</sup> eloquently expresses my sentiments as follows: "Many years of obstetric practice convince me that one of the most important accomplishments of the obstetrician is his ability so to guide his parturient patient through her antepartum period that she shall approach the time

of her delivery unafraid . . .

Natural childbirth has a definite place in obstetrics. However, it has limited usage, because the parturient not only is required to possess a certain personality, but also must have adequate time to become acquainted with the principles and practice of childbirth outlined by Read.

Since not every individual who chooses natural childbirth is built to have a baby without the active assistance of the obstetrician, patients should be prepared for the eventuality that the physician may change the plans in the course of events. In this way any disappointment in the manner of childbearing is less psychologically traumatic.

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# Roentgenologic Examination in Obstetric Cases\*

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R OENTGENOLOGIC examination is becoming increasingly useful in obstetric cases. Pregnant women fall prey to most of the diseases which affect the population at large. In addition, there are special indications for roentgenologic examination in some cases of pregnancy. The indications for such examination are listed in table 1. The more important indications will be considered in subsequent paragraphs.

### DIAGNOSIS OF PREGNANCY

Roentgenographic examination may be used to confirm or to rule out the presence of pregnancy. Although there are tests that will indicate pregnancy much earlier than roentgenographic examination, such examination may be indicated for other reasons. These include a coexisting uterine tumor which might make the stage of gestation difficult to determine, a tumor simulating pregnancy, an illegitimate pregnancy, or some other condition that might create a medicolegal problem.

The roentgenographic diagnosis of pregnancy depends wholly on the demonstration of the fetal skeleton, and this in turn is dependent on the deposition of a sufficient amount of calcium in the fetal bones. Although most authors concur in the opinion that roentgenographic examination will not disclose the presence of pregnancy with certainty before the sixteenth or eighteenth week of gestation, the literature contains reports of cases in which a roentgenologic diagnosis has been made at an earlier date. Even at the sixteenth week, the roentgenologic diagnosis is dependent on the absence of uterine or fetal motion, and multiple or oblique roentgenograms may be required.

# DETERMINATION OF STAGE OF GESTATION

Since the rate of development of the fetal skeleton in different cases varies considerably, the roentgenologist's estimate of fetal age in the sec-

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ond trimester is expressed as a mean from which there may be a variation of 20 per cent. The approximate age of the fetus may be determined from a number of roentgenographic measurements. Although the length of the femur frequently has been used for this purpose, it is more subject to error than other measurements. This is due to the fact that the image of the femur may be foreshortened on the roentgenogram. Other measurements that may be used for this purpose include the biparietal, frontooccipital and suboccipitobregmatic diameters of the skull, and the circumference of the skull. The biparietal diameter is particularly useful since it usually can be determined accurately from the projected image. The appearance of calcium in the distal femoral epiphysis at the eighth month of gestation is one of the most reliable indications of the age of the fetus.

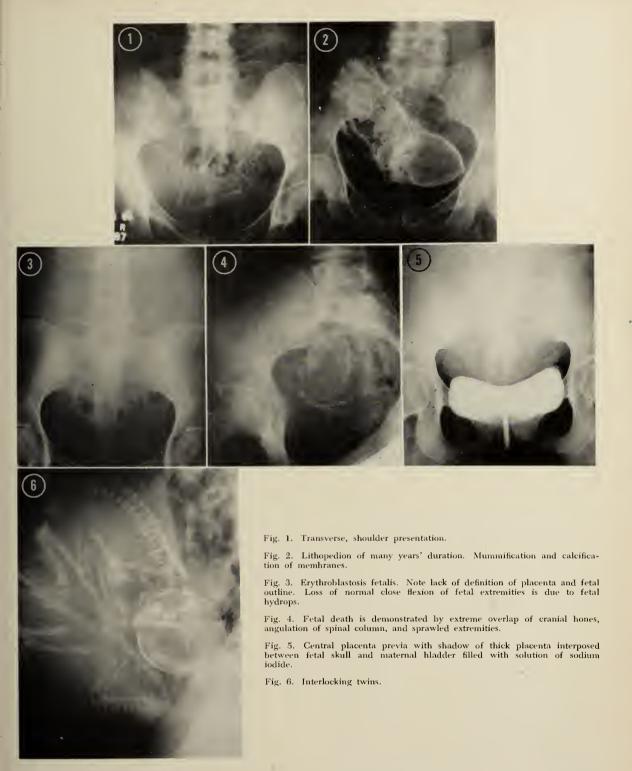
# PRENATAL ABNORMALITIES

After fetal development and uterine hypertrophy have advanced far enough to produce distinct roentgenographic shadows, the possibility of demonstrating the presence of prenatal abnormalities by roentgenologic examination increases with the stage of gestation.

Uterine abnormalities and threatened abortion. Although roentgenographic examination is rarely useful in the study of threatened abortion, such examination occasionally may confirm the presence of a suspected uterine fibroid and thus aid the obstetrician in explaining the presence of abnormal symptoms. On the other hand, failure of such examination to disclose a fetal skeleton in an enlarged and supposedly pregnant uterus may suggest the possible presence of a hydatid mole.

Fetal abnormalities. Roentgenographic examination may be of value in the diagnosis of multiple pregnancy and abnormal fetal presentations such as is shown in figure 1. Roentgenograms may also be useful to check the fetal position

Read at the meeting of the North Dakota State Medical Association, Minot, North Dakota, May 11, 1953.



attained after attempted external version. Stevenson¹ has called attention to the fact that the incidence of placenta previa is increased 70 fold in cases of transverse presentation, and he said that placentography should be performed before version is attempted in such cases.

Abnormal fetal development. This method of examination also may be useful in detecting the presence of the abnormalities of fetal development listed in table 1. Hydrocephalus is manifested roentgenographically by enlargement of the cranium, thinning of cranial bones, and wid-

# TABLE 1

# INDICATIONS FOR ROENTGENOLOGIC EXAMINATION 1N OBSTETRIC CASES

- I. Diagnosis of pregnancy.
- II. Determination of stage of gestation.
- III. Prenatal abnormalities.
  - A. Uterine abnormalities and threatened abortion.
  - B. Fetal abnormalities.
    - 1. Multiple pregnancy.
    - 2. Abnormalities of presentation.
    - 3. Abnormalities of fetal development.
      - a. Hydrocephalus.
      - b. Anencephalus.
      - c. Spinal abnormalities.
      - d. Miscellaneous skeletal abnormalities.
        - (1) Achondroplasia.
        - (2) Osteogenesis imperfecta.
        - (3) Fractures in utero.
        - (4) Cartilaginous or bony union of 2 fetuses (conjoined twins).
      - e. Extrauterine pregnancy.
      - f. Hydramnios.
      - g. Erythroblastosis fetalis.
      - h. Fetal death.
  - C. Placental complications.
- IV. Complications of labor.
- V. Pelvimetry and cephalometry.

ening of the fontanels and sutures. In making roentgenograms to study hydrocephalus, distortion should be avoided and care taken not to misinterpret roentgenographic magnification of the unengaged fetal skull as evidence of hydrocephalus. This is especially liable to occur in cases of breech presentation.

Extrauterine pregnancy. If the embryo is not expelled as a result of abnormal implantation, an ectopic pregnancy may progress in two ways: (1) if the condition will not support fetal life, the dead fetus may be sealed off in a fallopian tube or in the abdominal cavity and eventually become a lithopedion; (2) the fetus may remain viable and progress to maturity. In the latter case, delivery must be made by means of laparotomy. A lithopedion may be carried asymptomatically for many years and finally become surrounded by a calcified envelope of membranes (figure 2). Anderson, Counseller, and Woolner<sup>2</sup> reported that the incidence of lithopedion in cases of extrauterine pregnancy observed at the Mayo Clinic has decreased since 1926. They attributed this decrease to the fact that operation now is performed much earlier in such cases than it was prior to 1926. In a case in which

the presence of extrauterine pregnancy was suspected on the basis of the roentgenographic findings, laparotomy was performed at the thirty-third week of gestation because of recurring colonic obstruction. The patient delivered a viable fetus.

The eccentric position of a fetus, its situation high in the abdomen, and its abnormal or at least peculiar attitude all suggest the presence of extrauterine pregnancy. When the uterine shadow is small and in the midline, or when no uterine shadow can be discerned, the evidence is even stronger for extrauterine pregnancy. Usually also, especially when the fetus is not viable, it maintains a constant position at repeated examinations. Cross, Lester, and McCain,<sup>3</sup> in reviewing their experience, noted that by the usual clinical examination an extrauterine mass was recognized only 3 times in 16 cases, and they stressed the value of roentgenographic examination.

Hydramnios. This condition, which may be suspected clinically, is manifested on the roent-genogram as a peculiar, diffusely homogeneous increase in the density of soft tissues which tends to obliterate the usual distinctly different densities of the uterus, fetus, placenta, and fetal subcutaneous fat.

Erythroblastosis fetalis. When to the appearance of hydramnios is added a fetal attitude of deflexion, the so-called Buddha position of the fetus, which is due to fetal hydrops, a tentative diagnosis of erythroblastosis fetalis may be made. An example may be seen in figure 3. The presence of this condition may be suspected late in the second trimester on the basis of the roentgenographic findings, but diagnosis is more accurately made later in pregnancy. It is offered as a probable diagnosis by the roentgenologist, and should not be accepted by the clinician as final until confirmed by other data, or at delivery.

Fétal death. Occasionally, the obstetrician may wish to check his clinical suspicion of fetal death in utero by roentgenographic examination. If the roentgenogram discloses one or more of the following features, correct diagnosis is confirmed: (1) overlapping of the cranial bones while the patient is not in labor; (2) unchanging position of the fetus on repeated examination; (3) sprawled, abnormal attitude of the fetal limbs; (4) kyphotic angulation (not curvature) of the spinal column; and (5) later disorganization and change in density of bones. When pregnancy is near term, the signs of death may become evident within a very few days. Figure 4 demonstrates several of these features.

Placental complications. In approximately 20 per cent of all cases in which vaginal bleeding occurs in the last trimester, the bleeding is due to placenta previa. Scheetz, Good, and Hunt<sup>4</sup> several years ago reviewed the results of their roentgenographic study in such cases and found that this method of localizing the site of placental implantation was accurate in more than 90 per cent of cases. The experience of other investigators is similar. Placentography thus bccomes an important procedure when the physician is faced with this potential obstetric emergency. The procedure is not new, for Snow and Powell<sup>5</sup> and Ude, Weum, and Urner<sup>6</sup> first described it in 1934. Naturally the final diagnosis of placenta previa should rest on the combined results of interpretation of history, physical examination, and roentgenography.

Careful attention to the technic of making roentgenograms for this soft-tissue study is imperative. The employment of contrast media in the bladder or rectum may be of value. The patient should be studied in a standing position, which allows the presenting part to sink into the pelvis. Failure to visualize the placenta may be due to poor technic, improper positioning, hydramnios, or examination too early in preg-

nancy.

In well over 80 per cent of cases of pregnancy, the placenta is implanted in the upper uterine segment, at or near the fundus. When implanted in the region of the internal os, as in figure 5, a thicker than normal layer of soft tissue is shown between the presenting part and the bladder,

sacrum, or pubis.

Complications of labor. Caldwell, Moloy, and Swenson<sup>7</sup> have materially advanced the knowledge and appreciation of the factors involved in the normal mechanism of labor by making numerous roentgenographic examinations of women with different types of pelves. Their examinations were made during labor. By this means, they also have increased our understanding of the manner in which some mechanical factors may interfere with labor. They have pointed out that roentgenographic examination is practicable during labor, and may direct attention to some mechanical fault which is delaying the progress of labor. This may be a malpresentation or attitude, a pelvic anatomic defect, a fetopelvic disproportion, or some other mechanical fault. Both anteroposterior and lateral projections are advisable. Figure 6 illustrates an infrequent complication of labor.

Pelvimetry and cephalometry. This branch of obstetrical roentgenology is a large subject in itself, and can only be touched on briefly in this discussion. The foregoing statements are generally indorsed by obstetricians and radiologists, but the literature is voluminous and confusing concerning the merits, necessity, limitations, and methods of roentgenologic fetal and pelvic mensuration. There is also considerable controversy over the degree of finality with which a roentgenologic estimate of pelvic adequaey or fetopelvic disproportion should be accepted. Little argument can arise over the fact that roentgenologic measurement of salient pelvic diameters is very accurate and reliably done by several methods. The divergence of opinion comes in deciding which are the salient diameters and areas, or at just what level arbitrarily to establish a pelvic plane, and also in the reliability of estimating fetal size. Methods such as those of Caldwell, Moloy, and Swenson<sup>7</sup> and that of Ball and Marchbanks<sup>8</sup> are, to some extent, based on a skilled subjective perception, and, therefore, more subject to individual variation in evaluation than other methods dependent on objective measurement of definite dimensions or areas, such as those devised by Thoms,9 Colcher and Sussman,<sup>10</sup> Steele and Javert,<sup>11</sup> Mengert,<sup>12</sup> and Allen.<sup>13</sup> At the Mayo Clinic, a modification of Allen's method has been employed for a number of years.

Weinberg, 14 in reviewing his experience with midforceps procedures, commented that the relatively good results in his group of 1,000 cases were due to the use of pelvioroentgenography. Every patient in the series was studied in this manner before or during labor. By the use of roentgenographic pelvimetry, instances of pronounced pelvic contraction were found, and most patients with cephalopelvic disproportion were also selected in advance and the infants were not delivered with forceps operations, for these 2 conditions were considered definite contraindications for the use of forceps. Kaltreider<sup>15,16</sup> has critically reviewed several methods of pelvimetry in the light of his experience. His opinion agrees with that of most current authors in this field in that the roentgenologic prediction of contraction in either inlet or midplane should not be taken as a final proof of dystocia. While pelvic contraction can be measured, the roentgenographic interpretation of the forces of expulsion are impossible, and evaluation of the behavior of the fetus in the face of the other 2 factors of labor is not accurate except under trial. In short, roentgenographic pelvimetry is still an adjunct to obstetric practice. The examination is best made shortly before the expected date of confinement, since the cephalopelvic relationship is better delineated at that time.

# SAFETY OF ROENTGENOGRAPHIC EXAMINATION

A statement should be made in regard to the frequent question, "Will roentgenologic examination do the fetus any harm?" Martin and Williams<sup>17</sup> studied the problem and found that the average dose resulting from the 4 exposures incident to their method of pelvimetry, when measured at the vaginal vault at the fourteenth and thirty-seventh weeks of pregnancy, was 0.9 roentgen. Other investigators have found that the maximal estimated dose was only 10 roentgens, still a small dose. When roentgenographic pelvimetry is used at the usual time, late in pregnancy, the possibility of injury to mother or fetus appears beyond the realm of probability. Certainly much larger therapeutic doses have been given pregnant women who subsequently have given birth to normal infants. As the geneticists point out, however, the possibility of injury is greater in the early hours of embryonic develop-

Roentgenologic examination of the pregnant woman may frequently be of benefit to the obstetrician in studying the progress of abnormal gestational developments involving either the uterus, fetus, or placenta, and in aiding in the anticipated or actual conduct of labor. Roentgenographic findings are occasionally pathognomonic of an abnormality of gestation or parturition, and although usually not an end in itself, the examination is a widely useful procedure.

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N-ALLYL-NORMORPHINE may be used to prevent or successfully treat neonatal depression consequent to maternal sedation before delivery. When 10 mg, of the drug is injected into the mother antepartum, James E. Eckenhoff, M.D., George L. Hoffman, Jr., M.D., and Lonnie W. Funderburg, M.D., of the University of Pennsylvania, Philadelphia, find a significant reduction in the need for resuscitation and in the time required to gasp and breathe in infants born of parturients given opiates. The substance is less efficacious after nitrous oxide anesthesia and is ineffective after administration of ether. In 11 of 12 apneic babies the response was dramatic when from 0.1 to 0.2 mg. of normorphine was injected into the umbilical cord five to ten minutes post partum.

James E. Eckenhoff, George L. Hoffman, Jr., and Lonnie W. Funderburg: Am. J. Ohst. & Gynec. 65:1269-1275, 1953.

# Treatment of Carcinoma of the Cervix\*

HERBERT E. SCHMITZ, M.D., and CHARLES J. SMITH, M.D. Chicago, Illinois

Aстноиси the microscopic characteristics of carcinoma in situ were described by Robert Meyer as long as forty years ago, this pathologic entity received its greatest impetus from the work of Schiller, who had followed the lesions in individual patients over many years. It remained, however, for Papanicolaou with his cytologic studies to reveal the frequency of such lesions and to open the way for Graham and Meigs,1 Galvin and associates,2 Hertig and Younge,3 McKelvey,4 and many others to establish their ratio to invasive carcinoma, accuracy of diagnosis, determination of therapy and their life cycle. For the most part, Galvin's<sup>2</sup> definition of carcinoma in situ is acceptable and the treatment by surgical measures is firmly established. Although the questionnaires circulated and tabulated by B. Carter and associates<sup>5</sup> showed great variation in choice of procedure, those workers having the greatest experience appeared to have accepted uniform measures.

Great care must be exercised to be sure that an area of carcinoma in situ obtained by multiple small biopsies, with or without a previous positive smear, is not an area of cellular change bordering a true invasive carcinoma. Occasionally, when evidence seems to justify the opinion that we are dealing with the noninvasive stage of cancer, invasive disease may still be demonstrated if careful examination is carried out on the removed specimen. The incidence of invasive cancer discovered in our clinic by such means is 35.7 per cent of patients thought to have the noninvasive stage of the disease. Such an error is serious, as the treatment for invasive cancer should be much more extensive. For the preinvasive stage, when cellular changes are limited to the layers of epithelium (figures 1 and 2), we favor the following procedure:

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For the patient in the childbearing period before the age of 35, careful follow-up with smears and biopsy when indicated. If pregnant, or when conception takes place, monthly smears and repeat biopsy when indicated. Vaginal delivery is permitted, followed by smears as long as they remain positive in order to be alerted for any change in the situation. After 35, unless late marriage, or infertility of a corrective nature has existed, the condition should be treated by vaginal hysterectomy, removing a generous cervical cuff. The gonads may be preserved. If previous pregnancies make it unnecessary to accept the risk associated with the policy of watchful expectancy, then vaginal hysterectomy should be performed before 35 years of age, when the extent of the disease or cellular mitosis indicates the wisdom of such therapy. For all patients 40 years of age or older, the removal of the uterus is indicated as this eliminates risk and the need for frequent follow-up.

Such treatment admittedly has 2 weaknesses, namely: allowing a woman to retain her uterus when it harbors a preinvasive cancer, for which at a later stage in her reproductive life, we advocate hysterectomy because unrecognized invasive cancer may be present or may develop. Our defense of this plan is that the average age of the patient found to have preinvasive cancer is 36.5 years while the average age for the invasive stage of the disease in our clinic is 45 years. Reports of various authors have demonstrated that years usually elapse before these lesions progress from the localized change to invasion. Admitting that we may be in error or that further change is imminent, the desire of a mother to retain her unborn child or of a wife to become a mother far outweighs all other considerations and, therefore, we have permitted the patient to retain her uterus providing she submits to regular cytologic study and further biopsy studies when deemed desirable. Any

<sup>\*</sup>Second Annual Leonard W. Larson Cancer Lecturc. Presented at the North Dakota Society of Obstetrics and Gynecology, Grand Forks, North Dakota, September 18, 1652

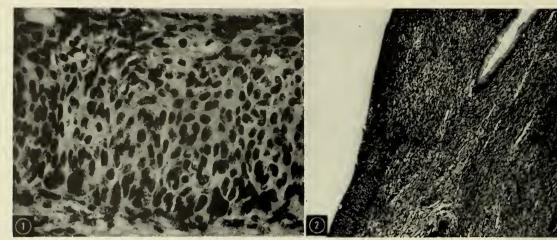


Fig. 1. Carcinoma in situ

Fig. 2. Carcinoma in situ at squamocolumnar junction.

change indicating progression of the process calls for immediate definitive therapy. To date, we have had no reason to regret this policy.

We consider cellular changes which involve all epithelial layers and invade ducts and lumina of glands (figures 3 and 4) an advancement in the stage of carcinoma in situ. An intense diagnostic search must be carried out to confirm the noninvasive nature of the lesion. Before the age of 35, if a pregnancy exists it should be allowed to progress while, with observation, palpation, smear and biopsy, we keep careful check on the cervix. If pregnancy does not exist and the desire for pregnancy is not of such intensity as to demand acceptance of the risk involved, then hysterectomy seems most rational to me.

Kottmeier's<sup>6</sup> optimism cannot be shared by this author as he states that in 42 of his 114 cases of preinvasive cancer who received no treatment, invasive carcinoma has hitherto developed in 13.6 per cent. This again strengthens the belief

that only for a very important reason, namely, childbearing, is this risk acceptable.

# INVASIVE CARCINOMA OF THE CERVIX

A discussion of the management of invasive carcinoma cannot be approached without a word relative to grouping or staging of the disease. Kottmeier, in his recent book on Carcinoma of the Female Genitalia, credits the late Henry Schmitz "as among the first to realize the importance of uniform and comparable therapeutic statistics." He first introduced the Schmitz classification into our clinic in 1912 and since then it has remained unmodified except for the addition of group 0 which includes the preinvasive stage. Kottmeier further states "Herbert Schmitz has tried to separate the very early cases of carcinoma from the gross obvious cases still confined to the cervix and to put them in a special stage. In the light of the propaganda for early diagnosis and early treatment, this may be of value." To

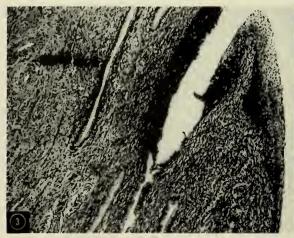
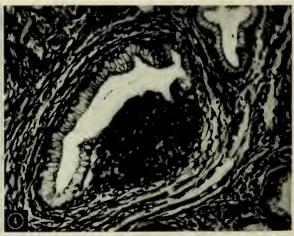


Fig. 3. Carcinoma in situ showing beginning gland involvement. Fig. 4. Carcinoma in situ with deep intraluminal involvement.



this I would add, of the utmost value, because the clinical extent of the disease determines the

end result of therapy.

From the first evidence of invasion, which is a microscopic diagnosis, to a lesion engulfing the entire cervix, is a relatively long period of time and, unless we stress an early stage in the progression of the disease, we may justify careless examination of the cervix. Certainly, if we teach smear technic and multiple biopsy procedures as a routine in every instance where the cervix has so much as a blemish on its surface or a defect at the squamocolumnar junction, then we must define the early stage of invasive disease as a lesion definitely localized to an area not larger than 1 cm. in diameter, whether it be exophytic or endophytic in character. We err in our definition when we use the international version, namely, stage I "The carcinoma is proved to be invasive and is strictly confined to the cervix." Meigs, as well as others, have demonstrated by examination of surgical specimens that the lymph nodes are invaded in 20 per cent or more of cases in this stage, thus refuting the statement "is strictly confined to the cervix." In the group I of Schmitz classification, this error is less than 2 per cent. This group carries a high five-year salvage and is the ideal stage for evaluating therapy, for, when tumor has reached the lymph nodes, it is a much more formidable enemy with few recoveries, mostly arrests through fibrosclerosis or surgical interruption of the lymphatic pathways.

# RADIATION

Our plan for the irradiation treatment of carcinoma of the cervix follows the Stockholm technic of radium and roentgen treatment, with the exception of slight variations in the time interval, filtrations, and the employment of roentgenograms in the range of 1,000 K.V. These slight variations make very little difference in the end result obtained. Our five-year absolute salvage parallels the Radiumhemmet results of 40.5 per cent for the years 1936 through 1945. The few major complications following this method and the absence of mortality have dissuaded us from altering the method except for the use of the Pitts and Waterman long needles of low source when disease persists in the paravaginal or parametrial areas. We have never employed this as a primary method.

# FOLLOW-UP

The patient accepted for treatment of carcinoma can never be discharged, and, as a result, confronts her physician with the problem of how

to keep her coming back. Obtaining such information as the social security number and the name of the life insurance company insuring the patient, in addition to the usual information of maiden name, address of relatives and several intimate friends, aids in tracing the patient should she fail to return for her scheduled follow-up appointment. Without knowing the end result of our treatment, it is impossible to evaluate the same and determine whether we are obtaining acceptable end results for our patients.

The intelligent management of malignant disease requires a knowledge of pathology, irradiation physics, surgical technic, as well as general medicine. Few members of the medical fraternity are proficient in all these branches, so today, guided by the program of the late Bowman C. Crowell and the American College of Surgeons, tumor clinics have been established throughout this country and the world. In these clinics, staffed by pathologists, radiation physicists, surgeons, and members of the various specialties, the cancer sufferer obtains the benefit of combined opinion. In an attempt to evaluate the benefits of such combined effort, we recently conducted a study of the results obtained in the management of 605 cases of carcinoma of the cervix treated under the direction of 8 certified gynecologists, all of professorial rank. The plan of treatment was left to the discretion of the various attending gynecologists without benefit of further advice unless requested. The five-year absolute survival in these 602 patients was 17.5 per cent. Inasmuch as the series differed in no way from comparable groups as to age, marital status, fertility, or the stages of their disease, they should have enjoyed the same survival rate reported by numerous tumor groups, namely, 40.5 per cent. We must conclude, therefore, that haphazard treatment of cervix cancer is costly.

The follow-up of patients registered in our clinic includes frequent cytologic study, as well as digital and visual evaluation. It has been determined that cells of a malignant nature can be recovered for as long as six months after completion of therapy. These cells, however, show definite irradiation effect if the therapy has been successful. If they fail to show the desired effect, then the possibility of an irradiation failure must be suspected and every means utilized to discover the persistence of the disease or recurrence of disease.

SURGICAL TREATMENT

Surgery undertaken at this time does not propose additional technical difficulty as fibrosis due to irradiation is not pronounced. Compli-

eations due to later fibrosis and the lessened blood supply after surgical dissection increase the incidence of fistulae slightly.

In this consideration, then, irradiation has in no way precluded successful surgical attack. On the basis of the success of therapy by radioactive means as previously outlined, we reserve the surgical approach for those cases which have demonstrated radioresistance and/or recurrence. For this reason, our experience has concerned the patient of undesirable status and we do not attempt a comparison with those series wherein the surgical method has provided the primary therapy and, perforce, included a highly selective group of patients amenable to successful treatment by any means. The extensive employ of radical surgery has awaited the development of the adjunctive sciences of anesthesiology, biochemistry, physiology, and bacteriology. The same concerted effort of specialists in a variety of scientific fields that obtains in the clinical management of the patient is carried out still further in the operating theater. The term theater. in its strict definition, is nowhere in better usage than that which serves the candidate for surgery for malignant disease. The pre- and postoperative preparation and care are as formidable and painstaking as the procedure itself and require the best efforts of a team of highly trained professional personnel.

Before the patient ever reaches the operating table, the magnitude of the surgical problem has been suggested by roentgen study and cystoscopic and proctoscopic evaluation. Depending on this information, the attack may be directed toward the reproductive system alone or in combination with the urinary tract and/or the alimentary tract. Careful planning for the diversion of the urinary or fecal stream will provide for a more successful and tolerable outcome. Undoubtedly, the more uninvolved excretory organs that can be spared, the greater the comfort afforded the patient and the more productive her

remaining years of life. Nevertheless, most of the disappointing results have occurred in those cases where well-meaning but ill-advised conservatism has been practiced. At any rate, the patient should be prepared both physically and psychologically for any eventuality. In our own cases, the number of radical Wertheim procedures and pelvic exenterations are about equal, indicating the dismal expectancy of salvage that we face. We feel, however, that the struggle must be maintained, for naught else is available for these doomed unfortunates in the light of present scientific achievement.

# ADJUNCTIVE THERAPY

The advent of the atomic age, and the investigation of heavy metal isotopes initially suggested new and hopeful horizons, but as clinical experience becomes available, these technics secm to be relegated to the role of palliative or substitutive utility. Cobalt<sup>60</sup> has afforded a means of overcoming the relative shortage of radium element for the rapeutic use, but the improvement in transportation facilities in recent years has brought radium within the reach of all. Cobalt's greatest value is its availability in a variety of forms such as wire, needles, plaques, and packs but such indications are relatively infrequent. Gold<sup>198</sup> is extremely difficult to handle and has only limited value in the treatment of visceral metastasis. Future refinements of this new field of physical science may some day provide a more logical and effective means of cancer control.

No discussion of the treatment of cervical cancer should close without a plea to the members of the practicing profession for a renewal of their effort and resolve to seize every opportunity and diagnostic aid to reveal the early presence of carcinoma. What greater service can we offer to those who repose their trust and confidence in our hands and what dreadful responsibility befalls him whose moments of solitude are disturbed by the words, "it might have been."

The authors wish to express their appreciation to Dr. Walter F. Schiller for the microscopic material presented.

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Our readers will recall that two years ago we published a series of letters from Dr. Ancel Keys, head of the department of physiological hygiene at the University of Minnesota, to Dr. J. A. Myers and the readers of Tiee Journal-Lancet. The letters were accounts of his medical observations during a year of foreign travel. Dr. Keys is now in Naples doing further research and studying in more detail cholesterol metabolism and its relationship to nutrition and cardiovascular disease. We are delighted to have the opportunity to present the second in another series of letters from him telling of his work and impressions in a foreign country.

# Notes from a Medical Journey

March 17, 1954

Faculta di Medicina, Universita di Napoli, Napoli, Italy

Dear Jay:

The time goes flying by; we still work from early morning until far past a reasonable supper time and Naples is still colder than would seem comfortable for the palms and the orange trees. But every other day now is really spring-like, though the laboratory temperature has yet to go as high as  $63^{\circ}$  F. We now start at about 8 a.m. instead of before 7 as we did the first few weeks when we were studying the heavy workers at the steel mills. But, best of all, we have done a great deal of work with, we think, highly significant results. The end of this research project promises to be much more accomplished than we could have expected when we planned the "invasion" of Naples.

Drs. Paul D. White, H. Malmros, and Gunnar Bjorck (the latter two from Sweden) have arrived on schedule and we have an unexpected addition to our group in the person of Dr. Robert Dale of Australia who is a new major member of the staff of Dr. J. N. Morris' Medical Research Unit in London. Dr. Vittorio Puddu of Rome, Drs. Poppi and Postelli of Bologna, and Dr. Bendandi of Modena have all visited us for some days with the result that we have access to much more material in Italy. In a couple of weeks we shall move operations to Bologna for a week where we shall see what the situation is in the Province of Emilia, the region of Italy with the highest fat consumption and -- reputedly -- the highest incidence of coronary disease. Our work in Bologna will be only exploratory but our colleagues there will carry on after we leave.

We finally finished the study of the heavy workers with a sample of 140 men, nicely distributed for age. And we discovered that by sticking to our professional job and treating the men as fellow human beings we could get along very well, in spite of the warnings we had about the impossibility of getting cooperation from "that bunch of communists." True, they all belong to a union completely dominated by the communists, but then they are all Italians, which means they are very human, essentially cordial, and not really dominated by political theories. I suppose if

my Italian were more fluent I should be more exposed to political discussion, but I must say that the heat of politics is less evident here than in the States.

The analysis of the data will take a long time, but several points are abundantly clear. The cholesterol values are much like those we found with the small sample of firemen we studied in Naples two years ago. There is the same rise in the serum with age until around 30 or 35 and no further age trend to 60. And the serum cholesterol values are low; at age 50 the mean value is about 50 mg. per 100 cc. lower than our "standards" for Minnesota. We are also interested to find that these heavy workers are, like the firemen, just about as frequently "overweight" as our businessmen "guinea pigs" in the Twin Cities. And it may be significant that we find practically no evidence of myocardial disease in this group, in spite of the fact the group was not preselected for health and more than half are over 45 years of age. Finally, the diet is low in fats and oils.

Since finishing the heavy workers, we have been studying the firemen. This time we shall do the entire fire department, or rather we shall study as many as we can before we leave, and then Dr. Fidanza will carry on through the rest of the group of some 550. On the firemen, as with the steel workers, we are doing the usual physical examination, a series of anthropometric measurements, a complete electrocardiographic study, serum cholesterol, and a detailed analysis of the serum lipoproteins by means of Swahn's new paper electrophoresis method. The latter method works beautifully; 2 analysts working together can keep up a pace of 12 samples a day if they count a "day" as ten to twelve hours. Swahn himself returned to Sweden last week end, but now Dr. Buzina (of Zagreb, Yugoslavia) carries on with the help of whoever else can be spared. There is no doubt that the concentration of the beta lipoproteins in the serum has importance for the development of atherosclerosis, but whether this is more significant than the cholesterol measurement remains to be seen.

One result of Dr. White's joining us here for a month is that he was immediately sought out by a former patient, now a prominent businessman here, and both of us were presented to the Naples Rotary Club last Besides a good lunch and another view of life in Naples, a real accomplishment was to interest the local "big shots" of business and to secure about 50 volunteer "guinea pigs" among them. Naturally, we are interested in studying these men because they live much as we do at home. Though their diet is much lower in fat than ours, it is still much higher than that of the general population. Like the poor, they eat a lot of spaghetti and bread, but they have more oil and fat on the spaghetti and about half of them use butter on their bread. And, like their American counterparts, they are almost completely sedentary and are mostly overweight. Already 10 of these men from 40 to 60 years of age have been in as subjects. Their cholesterol values are considerably higher, on the average, than we are finding in the poor men, and at least 3 of the electrocardiograms show evidence of myocardial disease. The most startling finding was that 4 of the first 10 have pronounced xanthelasma. yet to see xanthelasma in almost 300 men of the general poor population.

The clinical members of our team, that is Drs. White, Malmros, Bjorck, and Doyle, have spent most of their time visiting the local hospitals and clinics and talking with innumerable local physicians. have systematically gone through the hospital wards looking for heart disease. There is no doubt that a lot of rheumatic fever and valvular disease is here, but the absence of myocardial disease and coronary occlusion is really remarkable. Of course this gives us much more confidence in the evidence from the vital statistics as to the relative rarity of coronary disease in this area. If anything, it may be that "myocarditis" is overdiagnosed here because we have found a number of cases in whom the diagnosis was based on nothing but fibrillation or flutter with otherwise clean electrocardiograms and no angina. But the problem of getting an exact estimate of the incidence of coronary disease is extremely difficult. It is not made easier by the fact that the various medical services, even in the university or in the same hospital, are quite independent and do not exchange services or information.

This letter is all work and no play or "tourism" but that is the way we live. Naples teems around us, noisy, dirty, colorful, but we forget much of the strangeness and no longer look out the window when we hear street musicians outside, as I do at the moment, nor comment to see a small boy go down the corridor carrying a tray of tiny coffee cups and a pot of "caffe espresso." Lunch of half a loaf of wonderful Italian bread, an ounce of cheese, an orange, and a glass of red wine seems the most natural thing in the world and the clarity with which we see Capri across the Bay is noted only because of its relevance to the likelihood of rain in the next few hours. When Capri is very clear, rain is in the offing.

Speaking of Capri, last Sunday we all went there for the day and visited the delightful little villa at Anacapri where Paul White wrote the first edition of his book "Heart Disease" just 25 years ago. Dr. and Mrs. White were thrilled to show us around and to recall how they worked and savored the sea and the mountain that spring a quarter of a century ago. Though the sun stubbornly refused to beam, we had a wonderful time and plan a similar excursion next Sunday to the island of Ischia. Very appropriately, the first Italian edition of Paul's book (translated from the fourth American edition by our friends Poppi and Postelli) is just coming out and an advance copy arrived here last week.

Morning comes to us here in Naples seven hours before Minneapolis and I like to think the sun carries our greetings westward each day. Anyway, this tiny branch of the University of Minnesota sends best wishes to you and all our good friends back home.

ancel Kys

# Lancet Editorial

# Obstetrical Advances

Tetal mortality per 1,000 live births in 1945 was 41.8 per cent among ward patients, and 32.5 per eent among semiprivate and private patients. In 1953, the percentage among ward patients was 17.4 and 22.2 among semiprivate and private patients.

These terse figures from the annual report of the Presbyterian Hospital, New York City, speak far more clearly of the advance of obstetrics than pages of brilliant prose. Many more examples of progress in this branch of medicine could be cited.

The same holds true for the sister science gyneeology. Productive studies along many paths have continued to enrich our knowledge of both of these important fields within the medical profession. Physiologie and functional approaches to basic problems have aided and abetted the older morphologic anatomy and pathology, gross and microscopic, already well known several decades ago. Perhaps no segment of medicine has progressed more rapidly than that of reproductive physiology.

Without in any way detracting from many notable and, perhaps, more seientific advances in obstetrics in the last ten or fifteen years, I would like to draw attention to the rather recent interest in "natural childbirth." Dr. Sol T. DeLee covers this subject very ably in this special issue. It should be of interest to the reader to know that Dr. Grantly Diek Read's book, Childbirth Without Fear, was dedicated to Dr. Sol DeLee's distinguished father, Dr. Joseph B. DeLec, "for his kindly interest . . . and appreciation . . . " It is eminently fitting that this interest should pass from father to son.

The search for knowledge, especially by young women, about childbirth and the faets of life, is an old but real story. Many mature persons express a genuine desire for more specific information about the processes of reproduction and parturition. The hush-hush about sex and the wonders of procreation has been pretty thoroughly dispelled. Patients are growing bolder. The lay press and family magazines have been particularly voluble of late on the subject of childbirth. More scientific medical groups are also producing much readable material on this subject. Such organizations as the Academy of Medicine in Cleveland have gone still farther and are providing for public display three dimensional sculpture models of reproduction particularly the birth process. This type of information, which might be ealled "training for childbirth," can be very useful in furnishing the most authentic knowledge on the subject.

Few in the medical field, I believe, would take issue with thoughtful provision of accurate knowledge along these lines. Controversy becomes lively, however, when obstetric practice is broadened to include psychology and physiotherapy, as Dr. Read proposes and advocates. At least for the time being, it seems that physicians should have an open mind about "natural childbirth." Dr. DeLee and other leaders in the field of obstetries will in due time lead us to rational conclusions.

In the meantime, unbelievably strong claims are being made. The Russians recently have made phenomenal predictions, such as: "all ehildbirth can be rendered *completely* painless." While a few unbiased reports and some limited experiences in France are encouraging, I believe we should bide our time before taking too strong a position. Without being too dogmatic one way or the other, we might venture to say that the time is probably close at hand when a majority of women - but not all - will be able to obtain considerable - but not complete - relief from the pains of labor through programs of "training for childbirth."

REUBEN F. ERICKSON, M.D.



This department of The Journal-Lancet is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.

# Cancer of the Female Urethra\*

J. SYDNEY RITTER, M.D., ALLAN K. SWERSIE, M.D., and HENRY RITTER, JR., M.D.

New York City

Malicnancy of the urethra is rare but not uncommon in both sexes. In recent extensive surveys of the literature, McCrea¹ has tabulated 546 cases in females and 230 in males. The earliest case in a female was recorded by Boivin and Duges in 1833.

If we accept the concept of a direct relationship between irritation, chronic infection, and the development of malignancy, the greater incidence in females is to be expected. Exposure of the female urethra to birth trauma, cohabitation, frequent regional reparative procedures, leukoplakia, and infections account for this frequency. The vast majority of the cases occur significantly in married women who have had at least one pregnancy and are in the menopausal age group.<sup>2,3</sup>

The usual classification of such tumors is vulvourethral, and urethral. The former group is the larger and occurs at the junction between the stratified squamous epithelium of the anterior urethra and the transitional cell epithelium of the posterior urethra. The female urethra is 3 to 4 cm. long. Its lining is composed of extensions of vaginal and bladder mucosa. Periurethral glands are plentiful in the anterior and middle urethra, but few are present in the posterior portion. The numerous lymphatics in the mucosa and submucosa of the distal urethra drain into the inguinal nodes, whereas the proximal urethral lymphatics empty into the hypogastric nodes and thence into the iliac and deep pelvic chains. Focal and regional nodes are the usual primary sites of metastases.4 Over 90 per cent of these malignancies are carcinomas, squamous cell and adenocarcinoma, the latter type probably originating from the group of glands described by Folsom.

Early lesions may be confused with such common conditions as polyps, papillomas, caruncles, strictures, and urethral prolapses. The theory of a direct relationship existing between these benign growths and later malignant lesions has been discarded by



Fig. 1. Urethrocystogram showing filling defect at base of bladder. Symphysis smooth and narrow. January 1952.

most authorities. When a history of such a preexisting lesion is obtained, probably, in view of later pathology, an early malignancy was overlooked.<sup>5</sup> Should the cancer develop beyond focal limits and involve the vulva, periurethral tissues, bladder, and vagina, differentiation from syphilis, tuberculosis, or the other granulomatous diseases may be difficult. The urgency of careful repeated biopsies of suspected urethral lesions and frequent urethroscopic examinations cannot be overemphasized.

Symptoms vary according to site, size, and duration of the growth. The presenting complaint is usually a urethral mass associated with dyspareunia, burning on urination, frequency, printing vulvae, and

<sup>°</sup>From the McCarthy Urological Clinic, New York Polyclinic Medical School and Hospital.

a urethral discharge. Other symptoms may include urinary retention, incontinence, and bleeding. The average duration of symptoms has been reported as 9.4 months.<sup>6</sup>

A successful prognosis depends upon complete removal of the tumor. Obviously this is best done in focal lesions. Unhappily, most patients have extensive involvement before they are first seen. Radical excision of the tumor and roentgen therapy have been advocated. Ureteral implantation and total cystectomy have been mentioned. Urethrectomy with removal of the anterior vaginal wall and the vesical neck have been considered. Whatever the method chosen, the results have been uniformly poor.<sup>4–6</sup>

If cure is obviously out of the question, palliative measures such as diverting the urinary stream, fulguration of bleeding points, and excising painful metastases should be carried out.

#### CASE REPORT

We have recently seen a case of urethral malignancy in which there were several unusual features.

E. T., a 34-year-old Negro woman, was admitted to the gynecologic service in July 1950 complaining of burning on urination of several months duration, more acute during the past six weeks, with dyspareunia. The patient was nulliparous. Past history revealed ectopic pregnancy 1932, hysterectomy 1934, intestinal obstruction 1942, and vaginal bleeding 1950. Examination showed well-healed abdominal scars but no abdominal masses. A flat, hard, nontender area on the anterior vaginal wall was noted, just below the urethral meatus. Biopsy was reported as chronic cervicitis. There was no inguinal adenopathy. Frei antigen test and Wassermann were negative.

The patient was followed on the gynecologic service for six months, at the end of which time she

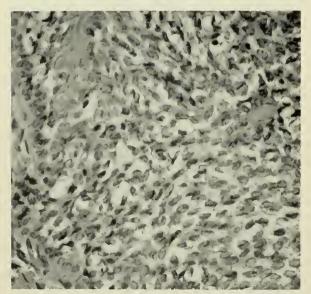


Fig. 2. Transitional cell carcinoma grade 3. Pronounced cellular atypism, pleomorphism, and mitosis. X360.



Fig. 3. Widening of symphysis with roughened edges. May 1952.

was referred to the genitourinary clinic. The complaints of burning on urination and vaginal spotting were given. On examination, mild tenderness was present upon deep palpation in the suprapubic region. Pelvic inspection revealed a reddened, thickened, pouting urethral meatus. On the anterior vaginal wall there was a firm, tender, irregularly infiltrated area extending distally from the urethral meatus 4.5 cm. by 3 cm. A 14F soft rubber catheter was passed into the urethra which was quite snug. Bladder urine was clear and contained 6 to 8 white cells, occasional red cells, albumin, and no casts. Acid-fast studies were negative and there was no growth on routine urine cultures.

Urethrocystogram (figure 1) showed an irregular filling defect at the base of the bladder. Attempts at endoscopy with an 18F panendoscope were unsuccessful despite anesthesia. With the use of urethral divulsion, as described by one of us,<sup>7</sup> a mass was seen intruding from the wall into the lumen about an inch from the meatus. Biopsy was reported as transitional cell carcinoma grade 3 (figure 2). An excretory urogram was normal as were roentgenograms of the lungs and pelvic bones.

The plan of treatment devised was to divert the urinary stream first in preparation for removal of the tumor. Accordingly, ureterosigmoidal implants were performed by the Coffey technic number 2. Intravenous urography, nineteen days later, revealed bilateral ureteral dilatation, pyelectasis, and calycectasis. The patient underwent total urethrectomy, partial vulvectomy, and subtotal cystectomy thirty-three days after the implantation. The anterior vaginal wall was removed, as was the posterior bladder wall. The remaining tissues were approximated in order to give some semblance of an introitus. The specimen was reported as transitional cell carcinoma grade 3. (Continued on page 238)

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Fig. 4. Complete destruction of left pubis and ischial ramus. Fracture of acetabular ring. Soft tissue mass in left obturator region. December 1951.

(Continued from page 236)

Within two weeks the patient complained of pain on the inner aspects of both thighs accentuated on abduction of the hip. Pain also was experienced over the symphysis pubis. Films taken six weeks after surgery showed early separation of the symphysis pubis with a bony irregularity suggestive of localized destruction (figure 3). Osteitis pubis was diagnosed. Bed rest, sedation, and antibiotic therapy were instituted. Barium enema studies were reported negative for any intrinsic lesion of the colon. Excretory urography revealed prompt bilateral function in good concentration with dye noted in the rectum. The patient was discharged free of pain two months after the last surgical procedure and was followed in our clinic. A small mass in the left lateral vault of the remaining vesicovaginal pouch was biopsied three months later and reported as a polyp. Excretory urography showed continued satisfactory function. Increased symphysial widening continued.

Pain on walking became so severe in the thighs and suprapubic region seven months after surgery

that the patient was readmitted. Repeat biopsy of the recurrent left lateral vault mass was reported as transitional cell carcinoma. Roentgenograms revealed extensive destruction of pubic and ischial rami as far as the acetabulum. A fracture of the superior public ramus without displacement was noted, and a soft tissue mass in the region of the obturator foramen seen (figure 4). The degree of bony destruction led us to suspect that we were dealing with a malignant spread to the area rather than an osteitis. Unfortunately, punch biopsy of the bony region involved was refused. After consultation with the orthopedic and radiologic services, it was decided to give a course of deep roentgen therapy. A total of 2,800 r. were administered to anterior and posterior left pelvic portals with some relief of pain.

The chemistries and blood count findings were still normal nine months after surgery. No evidence existed of spread beyond the bony pelvis despite careful radiologic survey.

The patient signed herself out against advice in December 1951 and consequently further follow-up was impossible.

#### DISCUSSION

This case is of interest not only because the patient was vounger than the average and was nulliparous, but also because of the extensive spread to the bony pelvis. The tumor which had been in existence, according to the symptoms, for several months before its diagnosis was originally made, had apparently remained well localized upon the subsequent admission. Despite extensive surgery, after preliminary diversion of the urinary stream, the case was complicated by the bony involvement, which we were inclined to believe was metastatic rather than inflammatory.

We have attempted to explain this spread by lymphatic drainage, by direct extension, or by trauma to the pelvis itself. Unroofing the periosteum during surgery may have exposed the underlying channels more directly to the expanding malignancy.

#### SUMMARY

A short consideration of cancer of the female urethra is presented with an interesting, somewhat atypical, case report.

Note: Since the preparation of this paper, further information has been obtained concerning the patient. She was hospitalized intermittently at another institution between January 1952 and March 1953, where the diagnosis of metastatic carcinoma of the left pubis and ischium was confirmed. Metastatic lesions in both lungs were found. Although this patient received further roentgen therapy and supportive transfusions, death occurred March 12, 1953. Permission for autopsy was denied.

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Pneumonia, by Hobart A. Reimann, M.D., 1954. Springfield, Illinois: Charles C Thomas. 212 pages. \$5.75.

Progress in diagnosis and treatment of pneumonia has advanced so rapidly within the past two decades that a monograph was needed to bring all information to date. This Reimann has done in a concise and yet complete manner. He promptly dispels the often expressed belief that pneumonia has been or soon will be eliminated by administration of antibiotics. He points out the incidence and severity of the untreated disease has not changed. However, present day chemotherapy shortens the course and reduces the death rate in some forms of the disease, particularly pneumococcic pneumonia. It still causes 50,000 deaths in the United States annually.

Pneumonias are grouped, as follows: (1) specific forms caused by a single variety of microbe, (2) those which are specific but occur as part of a systemic disease, (3) those secondary to some other condition and usually associated with mixed infection, and (4) those which are noninfectious in nature and are caused by a variety of factors.

This volume of 212 pages provides the reader with all the present necessary information on pneumonia. The book is of the usual fine design which characterizes all Thomas publications. It should be studied by physicians everywhere.

J. A. Myers, M.D.

Sectional Radiography of the Chest, by Irving J. Kane, M.D., 1953. New York City: Springer Publishing Co., Inc. Monograph of 151 pages, 101 figures.

Sectional radiography is given as a preferred term for the procedure variously called body section roentgenography, planigraphy, tomography, laminography, or stratigraphy. It is useful in studying many parts of the body, but this discussion is limited to the chest, and more speeifically to its value in the study of tuberculosis and malignancy. It is an accepted dictum in the minds of chest physicians, thoracic surgeons, and radiologists that this procedure may be of great value in diagnosis and more strict representation of pulmonary lesions, and that it may be useful in following lesions under treatment.

Sectional radiography is an ex-



pensive and time-consuming procedure, but failure to use the procedure may be labelled "false economy" if the patient may in some way benefit by its use. In suspected malignancy of the lungs, primary and secondary, the procedure may delineate at lectasis, soft tissue masses, and impingement upon the trachea or bronchi. Demonstration of cavitation and calcification are often of importance in tuberculous lesions.

While admitting the value of this and other special procedures, there are some fundamental principles in simple radiography of the chest which complement and sometimes make special procedures unnecessary or less often necessary. Care should be taken to assure technically good routine posterior-anterior and lateral views of the chest. At times the slightly overexposed or "Bucky" film, apical lordotic, and selected oblique films result in additive information concerning questionable infiltrates, location and number of metastases, and anatomic location of lesions. Experienced observers do not always agree when interpreting sectional radiograms as to what constitutes true cavitation, calcification, and intrabronchial growth. Anatomic distortion may render interpretation difficult even when meticulous technie is used.

Considerable room for argument also exists concerning the contention that both lungs should be included in the sectional radiograms. Here desire for demonstration of the presence of lesions must be balanced with optimum demonstration of individual lesions. Variations in technie are necessary for demonstrating lesions near the mediastinum as compared to those in the pulmonary parenchyma, and even various parenchymal conditions require technical variations. For this reason, it might be argued that optimum simple radiographic technics should be exploited as much as possible for the demonstration of the existence of lesions and that small field sectional radiography would then be used for a more strict demonstration of individual areas.

The principal thesis, that is, that sectional radiography is an indispensable aid in the study of thoracic disease, is a valid one, and ample demonstration by means of comparative rocutgenograms and sectional radiography is given.

Charles M. Nice, M.D.

Eugenics, Galton and After, by C. P. Blacker, 1952. Cambridge: Harvard University Press, 349 pages. \$5.00.

This delightful book offers a wonderful opportunity for anyone who hasn't already done so, to become a devoted admirer of Galton.

Although the reviewer has read all of Galton's books, he found this book full of interesting material. Galton was one of the most brilliant scientists that England ever produced, and probably the most versatile. Early in his life he was an explorer; he was always interested in physical anthropology; he practically founded the science of biometry and worked out many valuable statistical procedures.

He was much interested in the different faculties of different human beings. He was interested in heredity, and gathered much material showing that ability is inherited. He worked out methods of recording and filing fingerprints, he made the first weather maps, and he was one of the first men to study stereoscopic maps. He analyzed the factors which produce men of science, and he made composite photographs of persons suffering from some one disease such as tuberculosis. In later life he became interested in problems of eugenics, and he founded a eugenics laboratory. Galton was a half cousin of Darwin.

Dr. Blacker was well prepared to write this book because for twenty years he was secretary of the Eugenics Society. Galton's idea was that some day a nation should help eugenically favored couples so that they could marry early and have many children. It is sad that Galton and his wife, who should have given the world a dozen gifted children, had none.

Certainly this book should long be the most interesting and most convenient text for all those who would like to know something of what Galton was, what he did, and how the science of eugenics developed.

WALTER C. ALVAREZ, M.D.



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# American College Health Association News . . .

Dr. Norman S. Moore, Ithaca, New York, was elected president of the American College Health Association May 7 at the Fourth National Conference of the asso-



NORMAN S. MOORE

ciation, which was held in New York City May 5 through 8. Dr. Moore received his M.D. from Cornell University in 1926 and is now head of the department of clinical and preventive medicine at Cornell university Infirmary and Clinic. He is a fellow in the American College of Physicians and the American Medical Association, a diplomate of the American Board of Internal Medicine, former vice

president of the Medical Society of the State of New York, and author of many publications on internal medicine, student health, and nutrition.

The Executive Committee has approved the applications for membership of the following colleges and university:

Rockford College, Rockford, Illinois, is a municipal institution accredited by North Central Association, Phi Beta Kappa, and Association of American Colleges. It has a Faculty Health Council with a representative from the health service staff serving as a member. A freshman orientation series of lectures for one semester is required of all freshmen. The series is arranged by the director of physical education and coordinator of student affairs. The health service staff consists of one part-time physician and one full-time nurse, with specialists of all fields used for consultation. Health examinations are given to new students and to students seeking examinations voluntarily. Services are available to faculty and other employees. A consulting psychologist and faculty advisors provide mental hygiene services to students. Students are covered for accident and health by the Continental Casualty Company of Chicago.

Bennett College, Greensboro, North Carolina, has an enrollment of 438 undergraduate women students. A course in Personal and Community Health, taught by the division of science, is required of all students. A part-time physician, a part-time psychiatrist, and a full-time nurse are on the health service staff. A dentist and an eye specialist in the community are also available. Faculty and other employees are entitled to the services of the health department. Annual health examinations are given to all students. Instructors of psychology, biology, and physical education provide mental health services to the students.

Associated Colleges, Claremont, California, with an enrollment of 1,599 men and women undergraduates. Two full-time physicians, one part-time psychiatrist, four nurses, and one part-time technician are on the health service staff. All new and returning students are given health examinations and others may request examinations. A clinical psychologist and a psychiatrist are available for students who need mental hygiene services.

Colby College, Waterville, Maine, with an enrollment of 1,000 undergraduate men and women students. Two part-time physicians and four nurses are on the health service staff. Annual health examinations are given to all students. Medical and nursing care is given in rooming houses and dormitories. Faculty and other employees may avail themselves of the health department services.

University of North Dakota, Grand Forks, North Dakota, has an enrollment of 2,708 undergraduates and graduates. One part-time physician and four nurses are on the health department staff. New and returning students are given health examinations, as well as students seeking examinations voluntarily. Services are available to faculty and other employees.

0 0 0 0

The following institutions have just applied for membership:

University of Delaware, Newark, Delaware, with a total enrollment of 2,625 undergraduate men and women. The health service staff includes one full-time and two part-time physicians, one part-time psychiatrist, four full-time nurses, a receptionist, and secretary. Health examinations are given by the home physician to new students on entrance and to students seeking examinations voluntarily. Dr. Jerome Kay of the Psychological Counseling Service is available for students needing his help.

Ferris Institute, Big Rapids, Michigan, with a total enrollment of 803 undergraduate men and women. It has a combined Faculty-Student Health Council which meets monthly. Health examinations are given to new students on entrance and to those seeking examinations voluntarily.

Gettysburg College, Gettysburg, Pennsylvania, with an enrollment of 1,206 undergraduate men and women. Health examinations are given to students seeking examinations voluntarily. One full-time physician, one parttime psychiatrist, and three full-time and one part-time nurses are members of the health service staff. Mental hygiene services are provided by the college counseling service and the college physician who is a board-eligible psychiatrist.

Whittier College, Whittier, California, with an enrollment of 1,040 undergraduate and graduate men and women. The combined Faculty-Student Health Council, which has a representative from the health service staff, meets when necessary. The staff of the health service consists of a part-time physician and a full-time nurse.

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The secretary's office recently received a copy of Student Health Service in Finland, by Kari Savonen, M.D., director, student health service, Helsinki, Finland. The service is founded, administered, and maintained by the students themselves. They elect a responsible governing board of the service and decide on its budget, which is subject to approval by the universities.

According to the pamphlet, "the Student Health Service is in charge of both medical care and health care of the students. Its sphere of action includes every student registered in a University or Institute of Higher Education. Its activities are as follows: (1) mass examinations for tuberculosis case finding; (2) consultations during term time for medical care; (3) home calls and organizing home care of students in case of illness; (4) infirmary care; (5) providing hospital care; (6) care of students suffering from tuberculosis; (7) health education."



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\*Steigmann, F., and Goldberg, E., J. Lab. & Clin. Med. 42:955 (1953).

\*\*Mg trisilicate, 3.5 gr.; Ca carbonate, 2.0 gr.; Mg oxide, 2.0 gr.; Mg carbonate, 0.5 gr.

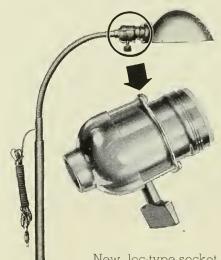
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# IRON THERAPY IN PREGNANCY

(Continued from page 214)

is not tolerated, (2) where oral iron is contraindicated, and (3) where rapid hemoglobin regeneration is required. Unless one of these requirements is met, the iron is easier and safer to administer orally. Until the safety of larger doses of intravenous iron is clearly established, the total dose of iron should never exceed 3 gm.

The response to intravenous iron by the iron deficient patient is more dramatic than when oral iron is given. The reticulocyte response is greater. The hemoglobin regeneration is more rapid. Studies have been made of 35 pregnant patients with iron deficiency anemia who were treated with intravenous iron. The daily increase in hemoglobin was 0.11-gm. per cent. This is about twice the daily increase observed when oral iron is used.

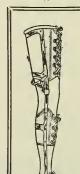
#### SUMMARY AND CONCLUSIONS

Iron deficiency accounts for the hemoglobin and hematocrit decrease in most pregnant patients, a decrease which has often been referred to as a physiologic anemia. Approximately 75 per cent of pregnant patients manifest some degree of iron deficiency and anemia. Patients who do show decreases in hematologic values in pregnancy are those with depleted or partially depleted iron stores. A daily iron supplement prevents severe anemia. In 80 per cent of patients, normal hematologic values can be maintained if an iron supplement is given for at least three months of the pregnancy. Evidence suggests that iron and cobalt provide the most effective hematinic for pregnant women.

Iron deficiency anemia in pregnancy can be effectively treated by means of oral or intravenous iron. Not enough attention has been given to iron therapy. If oral iron is used, treatment should be continued for prolonged periods in order to replenish iron reserves. Intravenous iron can be safely and easily used to correct iron de-

ficiency anemia.

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# Parkinsonism: Preliminary Report on Two New Antiparkinsonian Agents\*

HAROLD BERRIS, M.D.

Minneapolis, Minnesota

THE TREATMENT of parkinsonism is often unsatisfactory since the available drugs produce only partial symptomatic relief. This has given the impetus for development of newer and more effective therapeutic agents. Because of the large number of these agents now being investigated, we felt that a report of our experiences with two of these products might be of advantage, namely MK-02 (tropine benzohydryl ether methane sulfonate) and W-483 (Parsidol or Lysivane).

The solanaceous drugs which have been the mainstay of treatment for many years include stramonium, atropine, hyoscine, Bellabulgara, Vinobel, and Rabellon. These alkaloids reduce the rigidity to a variable degree, while the tremor is improved only slightly or not at all.

Because these drugs have a definite action on the nervous system, some patients develop toxic symptoms consisting of: psychosis, nausea and vomiting, constipation, diarrhea, urinary retention, excessive dryness of the mouth, and blurred vision. Older patients in particular experience a greater incidence of toxic side effects.

Synthetic drugs have been developed in an effort to improve the beneficial effects with a minimum of toxicity. Pipanol or Artane (trihexyphenidyl) has been demonstrated by Doshay

and Constable<sup>1</sup> and Corbin<sup>2</sup> to be effective in the treatment of extrapyramidal disease. The drug is very effective in reducing rigidity and is much less effective in its action on the tremor. Its side effects are, for the most part, milder than those of the naturally occurring compounds. Oculogyria is well controlled. Parpanit was used in 26 patients by Doshay and Constable.<sup>3</sup> They report a high incidence of intolerance to the drug. Schwab and Leigh<sup>4</sup> gave this drug to 50 patients and noted improvement in both rigidity and tremor, but they advised care in administration due to its toxicity.

Diparcol produced an adequate response in only a few patients and caused a high incidence of toxicity (Doshay and Constable,<sup>3</sup> Schwab<sup>5</sup>).

Benadryl, Thephorin, and Tolserol have been reported to be of value in the management of extrapyramidal disease.

#### CLINICAL STUDY - MK-02

Since patients with parkinsonism have improved with both atropine<sup>6</sup> and Benadryl,<sup>5,7</sup> a new compound, MK-02, has been developed in an attempt to combine the beneficial molecular portions of each. Doshay, Constable and Fromer<sup>8</sup> reported improvement in 13 of 20 patients who received this drug. In a later report, Doshay and associates noted improvement in tremor in 38 per

HAROLD BERRIS, a 1949 graduate of the University of Toronto, is with the division of neurology at the University of Minnesota.

From the Division of Neurology, University of Minnesota Medical School. Aided by a grant from the Teagle Foundation. cent of 40 patients, while the remaining 62 per cent obtained no benefit.<sup>11</sup>

Our study included 20 patients, varying in age from 30 to 78 years of age. Of these patients, 15 had postencephalitic parkinsonism. All of the patients had previously been on Artane therapy so that the results could be compared. The drug was supplied in 1 mg. tablets and the dose varied from 1 mg. a day to 1 mg. four times daily. This was the only medication given to 8 of the 20 patients, while in the other 12, it was used as an adjunct to standard therapy with the solanaceous drugs.

Of the total group, 7 of the patients reported subjective improvement with MK-02, but none demonstrated any corroborative objective evidence of benefit. In 6 of these 7 patients, MK-02 was used alone, while in the seventh, Artane was also administered. Although 3 of these patients reported definite subjective improvement with MK-02, they felt that better results were obtained from Artane and preferred to return to this drug. Only 2 of the entire group wished to remain on MK-02 in preference to Artane which was taken previously.

In all cases showing even subjective improvement, the dose of MK-02 was above 1 mg. three times daily. If the medication was dropped below this dosage, not even subjective improvement was obtained. Confusion was apparent in 2 patients with arteriosclerotic parkinsonism, and a third complained of nausea and palpitation.

#### CLINICAL STUDY - W-483

W-483 (Lysivane, Parsidol) is a modification of Diparcol consisting of 10- (2-diethylamino-propyl) phenothiazine. Garai<sup>9</sup> administered this product to 67 patients, either alone or in combination with Artane. He found that both drugs produced the best effects upon the rigidity rather than the tremor and that each was effective against oculogyric crises. Less toxicity was produced by Artane. Timberlake and Schwab<sup>10</sup> also gave this drug to 117 patients. They obtained definite improvement in up to 53 per cent of the patients, but felt that the drug was difficult to regulate because of the extreme wide range of dosage from patient to patient.

We administered W-483 to 19 patients with parkinsonism who ranged in age from 22 to 78 years of age. These patients had all been tried on the various standard forms of medication so that we were well able to compare their responses and the dosage necessary to the available drugs being used in this disease. This drug was available in 10 and 50 mg. tablets. The dosage was begun at 10 mg. four times a day, and was in-

creased by 10 mg, daily up to 50 mg, four times a day. If necessary, the dosage was then inereased by 50 mg, increments up to 1 gm, a day if tolerated by the patient. In 9 of these 19 patients, W-483 was used alone, while in the remaining 10, other standard medications were continued to see whether this drug could augment the action of the others and aid in the improvement of the symptomatology.

Of this total group, 8 patients showed definite objective evidence of improvement, particularly in regard to the tremor. In many of these patients reduction of the tremor was so definite that many of the self-care activities were greatly facilitated. Several of these patients, because of the reduction of tremor, were now able to shave themselves, light their own cigarettes and, in general, carry out a number of functions which were impossible while on the other medications. The rigidity, although definitely improved, remained at about the same level as when the patients were on standard medication. Of these 8 patients, 4 were on W-483 alone, while the other 4 were taking this drug as an adjunct to other medication. Of the remaining group, 1 patient noted no change, 4 felt that they were better on previous medication, even though objectively no definite difference could be observed, and evaluation was inadequate in 6 patients. This was primarily due to our lack of experience with this drug and our attempt, therefore, to increase it very slowly. Because of this slow increase, many of the patients' symptoms became exaggerated, and they became so discouraged that they refused to continue with the experiment.

The dose necessary to produce improvement varied from 30 to 300 mg. a day and all but 1 of the improved patients received more than 80 mg. a day. In the entire group, 4 patients developed toxic reactions. Confusion, which cleared when the drug was stopped, was present in 2 patients, 1 complained of headache, and 1 noted nausea.

#### CONCLUSIONS

MK-02 produced subjective improvement in 7 of 20 patients. All of these patients received 1 mg. three times daily or more. In no instance did objective evidence show that the symptomatology had lessened. Only 2 patients felt Artane to be less effective than MK-02.

W-483 (Parsidol, Lysivane) resulted in objective improvement in 8 of 14 patients. The drug appears to be relatively nontoxic and seems to

(Continued on page 294)

# Diabetic Detection Survey During Entrance Physical Examinations at a Small College: Preliminary Report\*

WILLIAM E. TAYLOR, M.D., KATHERINE CAUGHRAN, M.T., and BARBARA HILL Springfield, Missouri

THE NUMBER of diabetics in this country has been estimated to be about 2,000,000. Approximately 1,000,000 of this number are aware of their condition, leaving another 1,000,000 unknown diabetics. Estimate has also been made that around 4,500,000 of the present population of the United States eventually will become diabetic. Results of this survey and a survey done at the University of Southern California<sup>3</sup> seem to indicate that there are approximately 6 or 7 diabetics in each 1,000 college students, who are the usual age of freshman and new students.

Unless diabetes mellitus is found and treated in its early stages, such complications may occur as retinitis, arteriosclerosis with resulting coronary thrombosis and gangrene, coma, malnutrition, cataract, and diabetic neuropathy. The asymptomatic normal-appearing diabetic person is not free from the progressive degenerative pathologic changes which bring about these many complications. For the sake of the patient, diabetes must be controlled either by insulin, strict diet, or by both insulin and diet.

"There is experimental evidence that pancreatic islet cells can regenerate and that early pathological changes in diabetes are reversible. The island cells of the diabetic pancreas are thought to be in a constant process of destruction and regeneration, with eventual domination of the former. Thus the proper treatment of young persons with more resilient tissues may bring about appreciable regeneration of damaged cells." The importance of early diagnosis becomes apparent and cannot be overemphasized.

WILLIAM E. TAYLOR is director of the student health service at Southwest Missouri State College, Springfield, Missouri. KATHERINE CAUGHRAN is laboratory technician and BARBARA HILL is student assistant laboratory technician of the health service at Southwest Missouri State College.

Diabetic detection drives have shown that urine tests alone are not adequate.<sup>2,3</sup> Because of the time required, large numbers of blood sugars are impossible to run by the usual Folin-Wu method, so some other method must be used. The Wilkerson-Heftmann screening method<sup>4,8</sup> for blood glucose can be used quickly and accurately during large scale examinations.<sup>3,9</sup> Running one test requires about five minutes. This test is a screening test only, and tells whether the amount of glucose in the blood is above or below a specific point.

#### PRESENT STUDY

During the 1952-1953 fall and winter terms at Southwest Missouri State College, the student health service staff did 819 blood sugar screening tests during routine physical examinations. The initial Wilkerson-Heftmann tests were done in the afternoons between 2 and 5 P.M. These students were presumed to have eaten their usual lunch during the noon hour. Of the 819 students tested, 74 had a blood sugar level above 120-mg. per cent. These people were called back and given 50 gm. of glucose in a glass of lemonade one hour before a blood sugar test was done at the 170- to 180-mg. per cent level. The 50 gm. of glucose was given at 1 P.M. after the students' usual lunch. If their blood sugar did not go above 170-mg. per cent in one hour, and if they did not have glycosuria, they were considered normal. Only 56 students out of the initial 74 returned for the second test. Of the 56 rechecked, 15 had blood glucose above the 170mg. per cent level and were given a standard three-hour oral glucose tolerance test with blood sugar determinations by the method of Folin and Wu,<sup>6,7</sup> and a curve was established.

Routine urinalyses were also done on all stu-

<sup>\*</sup>From the Student Health Service, Southwest Missouri State College, Springfield, Missouri.

dents. Upon the first examination, 46 had a positive urine sugar test. Many of these were recorded as only a trace, and were doubtful positives. On their initial check, 6 had both glycosuria and a blood sugar level above 120-mg. per cent. There were 94 students who had either glycosuria or hyperglycemia on the initial screening test who returned for their recheck examinations by the Wilkerson-Heftmann method at the 170- to 180-mg. per cent level, after 50 gm. of glucose orally one hour before the blood sample was taken. From the number who received 50 gm. of glucose orally on their recheck examinations, 4 showed glycosuria with a blood sugar level below 180-mg. per cent. After the oral glucose, 8 had both glycosuria and hyperglycemia. Glucose tolerance tests were given to 21 students who showed either glycosuria or hyperglycemia on their recheck examinations. These students had not been on any preparatory standard diet when the first glucose tolerance tests were done. Tolerance tests were repeated on 8 of these individuals after three days of a high caloric diet containing 300 gm. of carbohydrate. Second tolerance tests were done on 2 people without any previous diet. Of the students showing abnormal first glucosc tolerance curves, 4 were not available for second follow-up tests.

#### METHODS

All the Wilkerson-Heftmann tests were done manually without benefit of a Hewson Clinitron.

The standard three-hour glucose tolerance test was done by the method of Folin and Wu using a photoelectric colorimeter. The blood filtrate was prepared by the method given in *Laboratory Methods of the United States Army*<sup>7</sup> and the photoelectric colorimeter method was followed as given in the Leitz manual.<sup>6</sup>

In the interpretation of our Wilkerson-Heftmann test values, we kept in mind that finger tip blood samples were used and the resulting high readings (that is + 170-mg, per cent) after oral glucose are due partly to the usual high concentration of glucose normally found in capillary blood as compared with that of venous blood. Fasting blood sugar values of capillary and venous blood may be equal. After ingestion of 100 gm. of glucose, however, the capillary values may be from 20-mg, per cent to 60-mg, per cent higher than the venous during the next three hours.

The Wilkerson-Heftmann blood sugar screening test utilizes a true blood glucose method, and values are somewhat lower than when the Folin-Wu method is used. However, when using capillary blood, the values are higher than when

using venous blood. In using a true glucosc method and capillary blood, the American Diabetes Association has recommended diagnostic values of above 120-mg. per cent for fasting samples and above 200-mg. per cent for postprandial samples.

### CRITERIA USED IN MAKING DIFFERENTIAL DIAGNOSIS

The following outline gives the criteria used in the differential diagnosis and the diagnostic terms used in classification.

- I. Diabetes mellitus. If the results of a standard three-hour tolerance test done by the Folin-Wu method, using 100 gm. of glucose, following three days of preparatory diet containing 300 gm. of carbohydrate, shows:
  - A. (1) that the fasting blood sugar is above 130-mg, per cent;
    - (2) the one-hour sample is above 170-mg. per cent: and
    - (3) the two- and three-hour samples are above 130-mg, per cent.
  - B. (1) that the fasting blood sugar is less than 130-mg, per cent;
    - (2) the one-hour sample is above 170-mg, per cent; and
    - (3) the two- and three-hour samples are above 130-mg, per cent.
  - C. (1) that the fasting blood sugar sample is less than 130-mg, per cent;
    - (2) the one-hour sample is less than 170-mg, per cent; and
    - (3) the two- and three-hour samples are above 130-mg. per cent.
- II. Potential diabetes. If the standard three-hour tolerance test as given above shows:
  - A. (1) that the fasting and one-hour samples are within normal limits;
    - (2) the two-hour sample is above 130-mg. per
    - (3) the three-hour sample is above 120-mg, per cent.
  - B. (1) that the fasting blood sugar is within normal limits;
    - (2) the one-hour sample is above 170-mg. per cent;
    - (3) the two-hour sample is above 130-mg. per cent; and
    - (4) the three-hour sample is above 120-mg, per cent.
  - C. (1) that the fasting blood sugar is within normal limits;
    - (2) the one-hour sample is above 180-mg, per cent;
    - (3) the two-hour sample is above 130-mg. per cent; and\*
    - (4) the three-hour sample is less than 120-mg, per cent.
  - D. (1) A + 170-mg, per cent reading on the second Wilkerson-Heftmann test;
    - (2) a reading above 130-mg, per cent on the two-hour samples of repeated tolerance tests.
  - E. (1) A + 120-mg. per cent reading on the initial Wilkerson-Heftmann test;

- (2) a + 170-mg, per cent reading on the second Wilkerson-Heftmann test;
- (3) a +130-mg, per cent reading on a fasting blood sugar sample;
- (4) with a reading above 170-mg, per cent on the first hour sample on the tolerance test;
- (5) a reading above 120-mg, per cent on the two-hour sample on the tolerance test.
- III. Temporary hyperglycemic glycosuria.<sup>5</sup> If the three-hour standard glucose tolerance test as given above shows:
  - A. (1) that the fasting blood sugar is less than 130-mg. per cent;
    - (2) the one-hour sample is above 170-mg. per
    - (3) the two- and three-hour samples are less than 130-mg. per cent; and
    - (4) glycosuria is present.
  - B. (1) A + 120-mg. per cent is read on initial Wilkerson-Heftmann test, with or without glycosuria;
    - (2) a + 170-mg. per cent is read on second Wilkerson-Heftmann test (after 50 gm. glucose orally), with glycosuria;
    - (3) the first-hour sample on tolerance test is
    - above 170-mg. per cent;
      (4) the fasting and the second- and third-hour samples are less than 130-mg. per cent; and
    - (5) glycosuria is present.
- IV. Renal glycosuria.
  - A. (1) Glycosuria in 1 or more urine samples during the standard three-hour tolerance
    - (2) all the blood samples during the tolerance test are less than 160-mg. per cent.
- V. Alimentary glycosuria.
  - A. (1) A + 120-mg, per cent is read on initial Wilkerson-Heftmann test, with glycosuria; or a + 170-mg. per cent is read on second Wilkerson-Heftmann test, with glycosuria; or both the tests are above the figures as given accompanied by glycosuria; and (2) the controlled standard three-hour toler
    - ance curve is normal without glycosuria.
- VI. Temporary hyperglycemia.
  - A. (1) A reading of +170-mg, per cent on the second Wilkerson-Heftmann test, (after lunch and 50 gm. glucose orally), without glycosuria; and
    - (2) the glucose tolerance curve is within normal limits.
  - B. (1) The fasting blood sugar on the three-hour tolerance test is less than 130-mg. per cent;
    - (2) the one-hour sample is above 170-mg. per
    - (3) the two- and three-hour samples are less than 130-mg. per cent; and
    - (4) glycosuria is not present.
- VII. Doubtful glycosuria or possible false positive test for urine glucose.
  - A. (1) Laboratory readings of "trace" on the routine Benedict's urine sugar test that do not persist and do not correlate with the blood sugar readings.
- VIII. Nondiabetic. During a standard three-hour glucose tolerance test by the method of Folin and

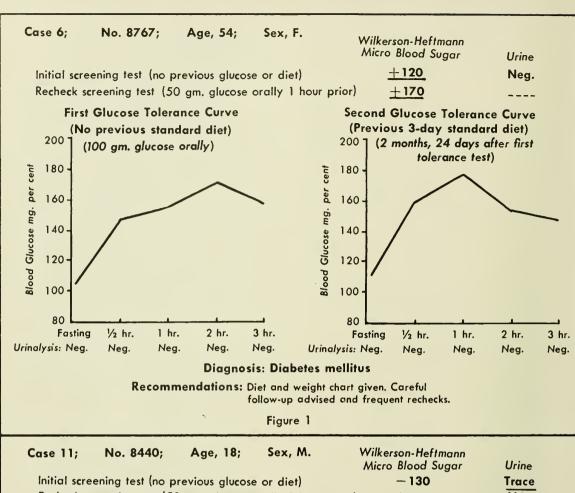
Wu, using 100 gm. glucose, with a three-day previous preparatory diet containing 300 gm, carbohydrate daily:

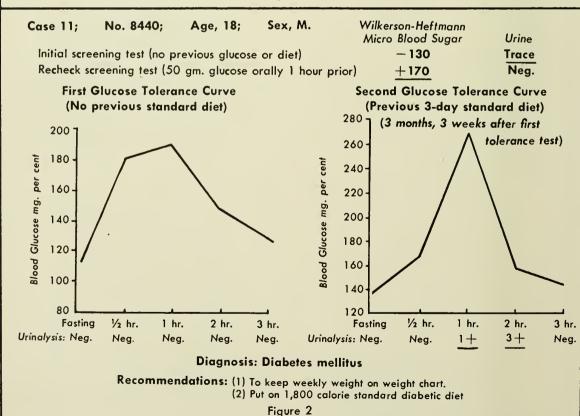
- A. (1) the fasting blood sugar sample is less than 130-mg. per cent;
  - (2) the one-half- and one-hour samples are less than 170-mg. per cent;
  - (3) the two-hour sample is less than 130-mg. per cent; and
  - (4) the third-hour sample is less than 130-mg. per cent.
- IX. Possible functional hyperinsulinism.
  - A. (1) Either two- or three-hour sample is less than 70-mg. per cent.
  - B. (1) Both second- and third-hour samples are less than 70-mg. per cent.
- X. Normal glucose tolerance curve. During a standard three-hour tolerance test as given above:
  - A. (1) the fasting blood sugar sample is between 70-mg. per cent and 120-mg. per cent;
    - (2) the one-half-hour and one-hour samples are 160-mg. per cent or below;
    - (3) the two- and three-hour samples are between 70-mg, per cent and 120-mg, per cent.

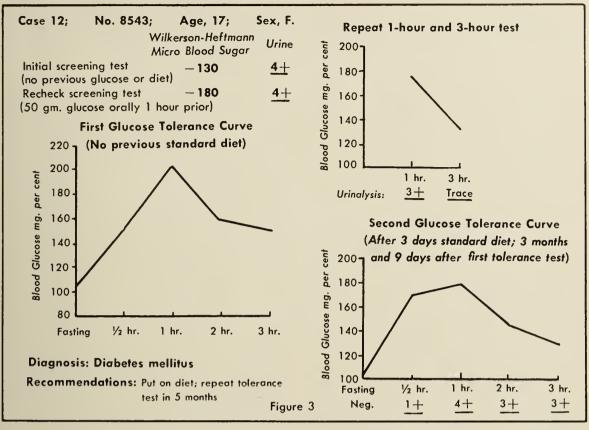
#### TABLE 1

		-
CASE	DIAGNOSIS	
NUMBER	MADE	
1.	Potential diabetic, doubtful glycosuria	
0	Potential diabetia	

- Potential diabetic, temporary hyperglycemic gly-
- 4. Possible potential diabetic, possible alimentary glycosuria, possible renal glycosuria, possible temporary hyperglycemia
- 5. Nondiabetic, doubtful glycosuria, temporary hyperglycemia
- Diabetes mellitus 6.
- Nondiabetic, doubtful glycosuria, temporary hy-7. perglyeemia, normal glucose tolerance curve
- 8. Nondiabetic, temporary hyperglycemic glycosuria, possible renal glycosuria, possible funetional hyperinsulinism
- 9. Nondiabetic, alimentary glycosuria
- Nondiabetic, alimentary glycosuria, mild hyper-10. thyroidism
- Diabetes mellitus 11.
- 12. Diabetes mellitus
- Nondiabetic, renal glycosuria 13.
- 14. Possible potential diabetes, temporary hyperglycemic glycosuria, possible functional hyperin**s**ulinism
- Nondiabetic, temporary hyperglycemia, normal 15. glucose tolerance curve
- 16. Nondiabetic, temporary hyperglycemia, normal glucose tolerance curve
- 17. Nondiabetic, alimentary glycosuria, normal glucose tolerance curve
- 18. Nondiabetic, temporary hyperglycemia, normal glucose tolerance curve
- 19. Nondiabetic, temporary hyperglycemia, normal glucose tolerance curve
- Nondiabetic, temporary hyperglycemia, normal 20. glucose tolerance curve
- 21. Nondiabetic, alimentary glycosuria, tolerance curve shows mild hypoglycemic reaction at second hour







The term "possible" preceding a diagnosis was used repeatedly in classifying those people who did not quite fit into a definite category according to our outline, but were thought to be close possibilities.

#### RESULTS

Of the 21 people given glucosc tolerance tests, 8 were diagnosed as nondiabetic and normal. Of the 21 people, 13 were shown to be abnormal in their reactions (table 1). Diabetes mellitus was diagnosed in 3 people (cases 6, 11, 12; figures 1, 2, 3).

In attempting to interpret the tolerance curves, the general physical condition of each student as revealed by the routine entrance examination was kept in mind. Tremors, enlarged thyroids, blood pressure readings, pulse rates, and evidence of nervousness and excitement were noted. Overweight and underweight individuals were called back for further examination. Basal metabolism tests were recommended and performed if indicated. A history of familial diabetes or thyrotoxicosis was kept in mind. Repeated morning and afternoon urinalyses were done on some. Inquiries were made concerning a history of previous hepatitis or liver disease. We found a definite conclusion exceedingly difficult concerning

the majority of these people with slightly abnormal tolerance curves.

Of the 3 diagnosed by glucose tolerance tests as having diabetes mellitus, 1 would not have been detected by a urine test alone. Another would not have been found by a urine test unless it had been collected at the right time, since none of the specimens showed sugar, except 1 that showed only a trace. The third would have been easily discovered since all urine tests showed sugar. There were also 2 known diabetics in the group examined. Therefore, of the 819 people examined there were 5 cases of diabetes mellitus.

#### DISCUSSION

Reinberg, Greeley and Littlefield,<sup>3</sup> working at the student health service of the University of Southern California, reported 3,132 students were tested with a blood sugar screening test on routine physical examinations of new students and 0.38 per cent were found to have diabetes. Out of 3,132 students, 0.26 per cent were known diabetics, making a total of 0.64 per cent with diabetes mellitus. Those students with possible potential diabetes totaled 0.19 per cent. Of the twelve newly discovered diabetics, 11 had positive reactions at the 130-mg. screening level in

the controlled series of tests. Only 4 diabetics would have been discovered by urinalysis alone, although 1 of these would have been missed if only blood screening tests had been done. Only 3 of the 12 diabetics would have been discovcred by uncontrolled tests alone.3

Fox,<sup>5</sup> working at the student health service, University of Minnesota, reported that urine tests were run on 19,358 students. Of these, 0.8 per cent were found to be glycosuries, 0.36 per cent were found to be diabetics, 0.16 per cent were found to be renal glycosuries, 0.24 per cent were found to be glycosuries but termed as normal variance, and 0.3 per cent were found to be temporary hyperglycemic glycosurics.<sup>5</sup>

By using both blood sugar tests and urine sugar tests, the results at Southwest Missouri State College and the University of Southern California compare very closely. The student health service at the University of Southern California found 0.38 per cent new diabetics and 0.26 per cent known diabetics, making a total of 0.64 per cent of the 3,132 students having diabetes mellitus.3 We found, at Southwest Missouri State College, 0.366 per cent new diabetics and 0.244 per cent known diabetics, making a total of 0.61 per cent of the 819 students having diabetes mellitus. There were 0.36 per cent who

were thought to be potential diabetics, 0.49 per cent were thought to be temporary hyperglycemic glycosurics, 0.12 per cent were found to be renal glycosuries, and 0.24 per cent were thought to be possible potential diabetics.

#### CONCLUSIONS

Diabetes detection in conjunction with routine entrance examinations of college students is done best by using a microblood sugar screening method plus routine urine sugar tests followed up by standard glucose tolerance tests. Quite a few students will show abnormal urine and blood findings that cannot be diagnosed as either diabetes mellitus or renal glycosuria; some may be potential diabetics. All students with abnormal findings should be rechecked at later dates with repeated glucose tolerance tests.

. Of the 819 students examined, 5 had definite cases of diabetes mellitus, 3 of these discovered by this survey.

We plan to continue this type of diabetic detection survey as a routine part of our entrance physical examination of college students. We hope that from the experience we are gaining, we may in the future be able to simplify our routine. These blood sugar tests should become eventually as commonplace as our required chest roentgenograms and urinalyses.

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Inhalations of dry dihydrostreptomycin dust prove effective for the treatment of respiratory infections. The inhalations are superior to dry penicillin aerosols, believe Mary Karp, M.D., and associates of Wesley Memorial Hospital and Northwestern University, Chicago. Undesirable reactions are slight and occur among less than 2 per cent of persons. Moderate or excellent improvement was obtained by 125 bronchiectatic patients given 1 or more tenday courses of treatment. A disposable plastic inhalator containing 50 mg. of the antibiotic is suitable for office treatment.

MARY KARP, M.D., and associates: Dis. of Chest 25:278-284, 1954.

## Hennepin County Neonatal Mortality Study\*

Minneapolis, Minnesota

The Hennepin County Neonatal Mortality Study is an analysis of all deaths occurring in Hennepin County under 28 days of age. The study, begun January 1, 1952, is a cooperative undertaking sponsored by the Hennepin County Medical Society, Minneapolis Pediatric Society, Minneapolis Health Department, Minneapolis Hospital Council, Departments of Pediatrics and Pathology of the Medical School of the University of Minnesota, and the Minnesota Department of Health. The committee working on the

study is drawn from all these groups. The work of this committee has opened a new vista. Representatives of public health, the state university, and private practice have examined a large mass of data. Discussions have brought out various viewpoints. The fields of knowledge and experience represented have included embryology, anatomy and pathology of the child in utero, prenatal care of the mother, physiology of labor and the newborn, early diagnosis of abnormality in mother and offspring, physical condition at birth, necessary laboratory and roentgenologic studies, and clinical observation during the newborn period. This attempt to reeducate the profession concerning its responsibility in the neonatal period is not unique. Sponsors of the present study are grateful to those who have given much to similar studies in the past. The general practitioner, the obstetrician, the pediatrician, and, in mortality studies, the pathologist, seem to be primarily concerned. However, all specialties participate.

In a study of mortality in the first 28 days of life, a record of the condition of the mother and the baby is obviously desirable. If a baby dies, both the public and the doctor should be made aware of the need for inquiry into the circumstances of the death. Postmortems are often requested by parents. Doctors should be even more desirous of postmortems, since they have had ample education concerning the contribution of pathology to medicine. A misunderstanding in the past has been that the adult or older child offers greater tangibility for study than the infant, and the full-term infant than the premature. Staff as well as resident, intern,

<sup>o</sup>Prepared by the Hennepin County Neonatal Mortality Study Committee, Minneapolis, Minnesota. and nursing personnel should work toward a complete analysis of all deaths in the newborn period. Committees in each hospital should review these cases and then submit their reviews to the general committee sponsoring the study. Hospital record librarians can help assemble material but are not qualified to judge its completeness or to make the appraisal. This type of analysis should be continued in the attempt to understand the hazards of the first day, the first week, and the first month of life. In discussing deaths occurring in the first hour, the need for correlation with stillbirths becomes obvious.

The committee making this study is well aware of reasons why mortality may be difficult to lower in the first day and the first week. All physicians, however, to whom such care is entrusted must assume responsiblity for better examinations and records. The present study indicates that there is no reason to regard neonatal deaths as largely inevitable. Every hospital in Hennepin County has shown an interest in studying the matter. Since the analysis of neonatal deaths was started, studies have been initiated on prematurity, sepsis, hyaline membrane and atelectasis, Rh factor, and surgical emergencies. It is hoped that these individual studies may complement the over-all study on neonatal deaths and that reports of such work will be made available to all hospital staff members.

General findings for the year 1952 are presented here in the hope that a similar summary may be done for each subsequent year.

During 1952, 19,910 live births occurred in Hennepin County. Of these 99.7 per cent occurred in hospitals. An attempt was made to analyze the figures by hospitals, but the material varies because some complicated cases were referred to specific hospitals. Such an analysis would therefore require a separate study. Only 64 infants were born at home. There were 354 neonatal deaths, a mortality rate of 17.8 per 1,000 live births. For these deaths, there were 333 with adequate clinical records and completed hospital neonatal committee reports. Thus, 95 per cent of the neonatal deaths are included in this report. In many cases additional data were obtained from the attending physician.

The births included 342 infants born to 320

mothers. There was 1 set of triplets and 20 pairs of twins. The number of individual twins surviving the neonatal period was 9, leaving 333 infants in the study.

Inasmuch as the gravidity of Hennepin County mothers has not been tabulated, the actual neonatal mortality rate on this basis cannot be accurately determined. Probably, however, the number of deaths of infants in the first 3 pregnancies largely reflects the higher proportion of infants born in this group of mothers. In Hennepin County, 72 per cent of deaths occur during the first 3 pregnancies, compared with 73 per cent in Minnesota as a whole (figure 1). Of the 320 mothers, 225 gave birth to immature and 95 to full-term infants.

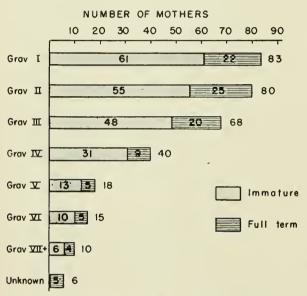


Fig. 1. Gravidity of 320 Hennepin County mothers, 1952.

Considered by age of mothers, 58 per cent of the neonatal deaths occurred in the age group 20 to 29 years and 19 per cent in the age group 30 to 34 years (table 1). This proportion coincides closely with the number of women in these age groups, giving birth to babies throughout the state in 1952.

TABLE 1 AGE OF 320 HENNEPIN COUNTY MOTHERS IN 1952

Age		Immature	Full term	Total
16-19 years		13	3	16
20-24 years		77	25	102
25-29 years		59	26	85
30-34 years		43	17	60
35-39 years		27	14	41
40-45 years		2	1	3
Unknown		4	9	13
	Total	225	95	320

The persistence of a high neonatal death rate in spite of constantly falling maternal and infant mortality rates offers a challenge to both obstetricians and pediatricians. It is important that every pregnant woman should receive adequate prenatal care. In the present series, 51 women or 16 per cent of the cases included received inadequate or no prenatal care. This lack of care was due almost entirely to failure of the woman to see her physician early in pregnancy. Thus the patient herself plays a very responsible role in the reduction of early infant mortality.

TABLE 2
OBSTETRIC COMPLICATIONS ASSOCIATED WITH NEONATAL DEATHS IN HENNEPIN COUNTY IN 1952

Immature	Full term	Total
23	4	27
14	3	17
12	_	12
13	5	18
ion 4)		
6	4	10
8	3	11
5	-	5
1	2	3
1	2	3
2	0	2
1	0	1
1	0	1
1	0	1
0	1	1
1	0	1
1	0	1
otal 90	24	114
	23  14 12 13  ion 4)  6 8 5 1 1 2 1 1 0 1 1	14 3 12 - 13 5  ion 4)  6 4 8 3 5 - 1 2 1 2 2 0 1 0 1 0 1 0 0 1 1 0 0 1 1 0 0 1 0 0 1 0 0 0 0

Of all neonatal deaths, one-third or 34 per cent were associated with obstetric complications, but in almost two-thirds of these deaths there were no known obstetric abnormalities (table 2). In premature deliveries, 40 per cent were associated with obstetric complications, but such complications occurred in only 25 per cent of full-term These complications were mostly deliveries. abruptio placentae, placenta previa, and undiagnosed types of antenatal bleeding, toxemias, polyhydramnios, and diseases of the mother. The expectant treatment of bleeding in the last trimester should reduce the incidence of prematurity due to these conditions. Hospitalization and expectant supportive treatment continued as close as possible to term should help reduce neonatal mortality. In only 5 cases did mismanagement occur during delivery.

The table showing type of delivery supplies a small number for analysis. In the whole group,

TABLE 3
TYPE OF DELIVERY IN 333 NEONATAL DEATHS IN HENNEPIN COUNTY IN 1952

	1000 gm.	Immature 1001–2500 gm.	r u	Total		
	(2 lb, 3 oz.) or less	(2 lb. 4 oz.– 5 lb. 8 oz.)	Full term	Number	Per cent	
Cephalic	42	89	69	200	60.1	
Breech	38	31	8	77	23.1	
Version and extraction		1	2	3	0.9	
Cesarean section	3	20	9	32	9,6	
Unknown	8	6	7	21	6.3	
Total	91	147	95	333	100.0	

60 per cent of the deliveries were cephalic and 23 per cent were breech (table 3). The large proportion of breech deliveries is due to the fact that this type of presentation is fairly common in immature births. Breech deliveries decrease in frequency with increase in birth weight. Cesarean sections contribute another 10 per cent of neonatal deaths, which are analyzed in table 4.

The relatively high incidence of cesarean sections in neonatal deaths was due to obstetric complications. There were 32 sections or 9.6 per cent. The larger proportion were done to deliver an immature infant 1001-2500 gm. because conditions such as placenta previa and abruptio placentae (7 cases) frequently require a section before the end of full-term pregnancy as an emergency measure. In 10 instances, sections were done early in pregnancy for the benefit of the mother because of toxemias (table 4). There were 10 elective cesarean sections for pelvic disproportion and/or previous section. There is danger of obtaining a premature infant when a repeat section is done. Perhaps the common practice of performing such sections two weeks before the expected date of confinement should be altered to one week or less. The frequency of miscalculation on the basis of the last menstrual period is well known. The cause of the infant's death is most informative because of the preponderance of abnormal pulmonary ventilation with resulting anoxia. Deaths of one-half of full-term infants delivered by section and virtually all deaths of immatures were due to this.

On the basis of weight, 6 per cent of all live births in Minnesota are immature, but 71 per cent of the neonatal deaths are immature infants (table 5). For infants weighing less than 750 gm., death is more or less inevitable at present. Very few infants weighing between 750 and 1000 gm. will survive. Actually, then, on the basis of weight alone, few of this group of 91 infants could have been salvaged. Of the remaining 240, 60 per cent were premature and 40 per cent were full-term weight.

More than half of the immature infants but only one-fourth of the full-term infants died during the first twelve hours. Of the immature infants, 67 per cent died in the first twenty-four hours, whereas only 37 per cent of the full-term infants died in that period; 81 per cent of the immature infants died in the first forty-eight hours but 53 per cent of full-term infants died during that period (figure 2).

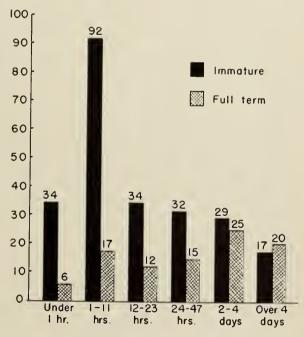


Fig. 2. Number of neonatal deaths by length of life immature and full term, Hennepin County, 1952.

The table of causes of death merits discussion concerning classification under abnormal pulmonary ventilation. This is Edith Potter's classification that includes all infants who show no specific pathologic lesions outside the lungs on postmortem examination, such as extreme immaturity of the lungs, hyaline membrane disease, and atelectasis from any cause. This differs decidedly from the usual statistical classification but may,

			Cause of Death of Info	int —
		1000	1001–2500 gm.	
	I., J.,	1000 gm. or less	(2 lb. 4 oz.—	r. n
	Indication	(2 lb. 3 oz.)	5 lb. 8 oz.)	Full term
1.	Placenta previa at 28 weeks		Immaturity,	
2.	Placenta previa at 29 weeks	Abnormal pulmo- nary ventilation	unqualified	
3.	Placenta previa at 32 weeks	may ventuation	Abnormal pulmo-	
4.	Placenta previa at 32 weeks		nary ventilation Abnormal pulmo- nary ventilation	
5.	Placenta previa at 34 weeks		Abnormal pulmo-	
6.	Abruptio placentae at 26 weeks		nary ventilation Abnormal pulmo-	
7.	Abruptio and placenta previa at 32 weeks		nary ventilation Immaturity,	
8.	Toxemia at 20 weeks		unqualified Abnormal pulmo-	
9.	Toxemia at 28 weeks	Abnormal pulmo-	nary ventilation	
10.	Toxemia at 28 weeks	nary ventilation	Immaturity,	
11.	Toxcmia at 31 weeks		unqualified Abnormal pulmo-	
12.	Toxemia at 31 weeks		nary ventilation Immaturity, unqualified	
13.	Toxemia at 32 weeks	Abnormal pulmo- nary ventilation	unquamed	
14.	Toxcmia at 32 weeks	inity ventuation	Abnormal pulmo- nary ventilation	
15.	Toxemia at 34 weeks		Abnormal pulmo- nary ventilation	
	Toxemia, premature separation of placenta at 37 weeks		,	Abnormal pulmo- nary ventilation
17.	Elective, pelvic disproportion, previous section, at 36 weeks		Pneumonia	
18.	Elective, 2 previous erythroblastotic still- births, at 36 weeks		-	Erythroblastosis kernicterus
19.	Elective, pelvic disproportion, previous section, at 36 weeks		Abnormal pulmo- nary ventilation	
20.	Elective, previous section, at 36 weeks		Abnormal pulmo- nary ventilation	
21.	Elective, previous section, at 37 weeks		Abnormal pulmo- nary ventilation	
22.	Elective, pelvic disproportion and poly- hydramnios, at 37 weeks		nary ventuation	Abnormal pulmo- nary ventilation
23.	Elective, previous section, at 38 weeks		Abnormal pulmo-	may ventuation
24.	Elective, previous section, at 38 weeks		nary ventilation	Congenital endo- cardial sclerosis
25.	Elective, pelvic disproportion, previous section, at 39 weeks		Pneumonia	2 3 36.6. 30.0
26.	Elective, breech, older primipara, at term			Abnormal pulmo- nary ventilation
27.	Pelvic disproportion, at term			Congenital encephalomyelocele
	Pelvic disproportion, at term			Congenital heart disease
29. 30.	Osteomyelitis of hips, in labor, at 32 weeks Breech, no dilatation, at 31 weeks		Anoxia Congenital dia-	
31.	Severe diabetes, toxemia at 36 weeks		phragmatic hernia	Abnormal pulmo-
32.	Moderately severe diabetes at 37 weeks			nary ventilation Congenital hydro- cephalus

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TABLE 5
ANALYSIS BY WEIGHT OF INFANTS OF 333 NEONATAL
DEATHS OCCURRING IN HENNEPIN COUNTY IN 1952

	No.	Per cent	
750 gm, or less	58	17.4	)
(1 lb. 10 oz. or less) 751 gm. – 1000 gm. (1 lb. 10 oz. – 2 lb. 3 oz.)	33	9.9	70.8%
1001 – 2500 gm. (2 lb. 3 oz. – 5 lb. 8 oz.)	145	43.5	J
2500 gm. and over (5 lb. 8 oz. and over)	95	28.5	
Not determined (immatures)	2	0.7	
Total	333	100.0	

however, be of more interest clinically. Included are all deaths of infants weighing 1000 gm. or less, 54; atelectasis, 54; and hyaline membrane disease, 7; a total of 115 immature infants. There were 14 full-term infants (12 with atelectasis and 2 with hyaline membrane disease) who had abnormal pulmonary ventilation (table 6).

There is room for considerable variation in interpretation of anoxia, intracranial hemorrhage, and birth trauma. Only 4 cases of intracranial hemorrhage without birth trauma occurred, and these were included under "other causes." Comparison of the causes of death for immature and for full-term infants shows that more than 3 times as many immatures as full-term infants died of abnormal pulmonary ventilation (table 6). On the other hand, almost 4 times as many full-terms died of congenital anomalies, twice as many of infection, and 6 times as many of erythroblastosis. The deaths from congenital abnormalities are analyzed in table 7.

The evidence that as few as 3.9 per cent of deaths were due to birth trauma indicates that excellent obstetric care is provided in the hospitals of Hennepin County. These hospitals had only one-third of the over-all Minnesota rate of deaths due to birth trauma. Worthy of note is the fact that no deaths were due to congenital syphilis.

Reduction in the large number of deaths due to congenital anomalies requires accurate diagnosis and early competent surgery. In this series there were 13 surgical cases, all but 1 were fullterm infants, 9 males and 4 females. The condition at birth was apparently good in 10, with first symptoms occurring at birth in the other 3. Symptoms could be recognized in the others during the first twenty-four hours. The intestinal tract was involved in 11 cases, and 2 were bilateral atelectasis. Roentgen studies were done in all cases, but few laboratory or bacteriologic studies. Operation was performed from nine to seventy-two hours after birth. Atelectasis was treated in 2 cases by thoracotomy, but this procedure has now been abandoned. Other conditions found on operation were 2 cases of tracheal esophageal fistula, 3 diaphragmatic hernia, 1 meconium ileus and perforation of small bowel, 1 gangrene and perforation of small bowel, 1 atresia of small bowel, 1 congenital atresia of ileum, 1 volvulus and necrosis of small bowel, and 1 hernia and obstruction of small bowel.

Autopsy was performed in 6 instances. In 5 deaths, there was associated pulmonary involvement, at electasis or aspiration, and in 1 bronchopneumonia. The other 7 cases did not have postmortem examinations, which is regrettable.

In only 8 deaths, pediatric care was inadequate. In 4 cases of pneumonia, antibiotic treatment was not administered. In 4 cases of erythroblastosis, the mother and/or the infant were not tested properly or treatment was inadequate or started too late.

A spot check of hospital records of newborn infants showed that adequate records were found in fewer than 50 per cent of the births, indicating either that the infant was examined but the physical findings were not recorded or that the newborn was not examined. In 2 neonatal deaths, the infants had been discharged from the hospital without any examination either at birth or at discharge and were readmitted shortly

TABLE 6
CAUSES OF DEATH IN 333 NEONATAL DEATHS IN HENNEPIN COUNTY IN 1952

	Imn	Immature		Full term		Total	
	Number	Per cent	Number	Per cent	Number	Per cent	
Abnormal pulmonary ventilation	115	48.3	14	15.0	129	38.7	
Congenital anomalies	27	11.4	40	42.1	67	20.1	
Immaturity unqualified	50	21.0	_	_	50	15.0	
Anoxia (fetal and unspecified)	15	6.3	9	9.4	24	7.2	
Infection	12	5.0	10	10.5	22	6.6	
Birth trauma	7	2.9	6	6.2	13	3.9	
Blood dyscrasia	5	2.1	13	13.7	18	5.4	
Other	7	2.9	3	3.1	10	3.0	
Tot	al 238	99.9	95	100.0	333	99.9	

thereafter and subsequently died from conditions overlooked at first discharge. The importance of adequate records on obstetric and newborn cases must be emphasized to all hospital staffs.

Rh determinations are not being done rontinely. There is little reason why 30 per cent of these mothers do not receive the benefit of a laboratory test that is readily available in Minneapolis (table 8).

In Rh determination, 171 mothers were found to be positive and 52 negative. Frequently the husband's Rh was not determined and maternal Rh antibody titre determinations were not done. Erythroblastosis is basically an obstetric problem because the obstetrician must have the necessary prenatal and postdelivery hematologic laboratory procedures carried out and must alert the pediatrician in advance. After the birth of the infant, the treatment becomes the responsibility of the attending physician or pediatrician. The obstetrician must provide diagnostic and preventive care; the pediatrician provides therapy.

The true cause of death in immature infants can be determined only by careful clinical investigation and thorough postmortem examination. The cause of death listed on the death certificate should be the correct anatomic cause. Prematurity per se is not a cause of death but is a measure of the length of gestation in utero. A thorough postmortem examination should be done by a competent pathologist familiar with fetal and infant pathology. Included should be a gross examination of the entire body, including the brain and cranial cavity, plus microscopic examination of any tissue necessary to make an accurate and complete diagnosis.

Autopsies were performed in 59 per cent of the neonatal deaths. One-half of the immature infants and more than three-fourths of the fullterm infants were autopsied (table 9). Every effort should be made to obtain a satisfactory postmortem examination in all infant deaths.

#### SUMMARY

Continued high neonatal mortality, especially in premature infants in the early hours of life, must be regarded as a national reproach. The persistence of a high neonatal death rate in spite of constantly falling maternal and infant mortality rates offers a challenge to physicians, especially obstetricians and pediatricians. The influence of maternal complications on neonatal mortality must be analyzed and emphasized. The necessity for early and adequate prenatal care must be stressed. To reduce the incidence of immaturity, the intrauterine existence of the

TABLE 7

ANALYSIS OF CONGENITAL MALFORMATIONS IN 67 NEW-BORN INFANTS DYING IN HENNEPIN COUNTY IN 1952

BOICK INFANTS DIING IN HEXNEFIX C	OUNT1	IN 1952
		Total
Anencephalus		7
Malformation nervous system		15
Spina bifida, meningocele	6	
Encephalo-myelocele	ì	
Congenital hydrocephalus	7	
Microcephalns	1	
Malformations circulatory system		26
Tetralogy of Fallot	2	
Interventricular septal defect	-	
Interauricular septal defect	ì	
Atrioventricular septal defect	1	
Transposition great vessels	î	
Coarctation aorta		
Bilocular heart (truncus arteriosus)	9	
Trilocular heart	9 9 1	
Other	10	
Rudimentary left ventricle		
and subendocardial fibroelastosis	1	
Subendocardial fibroelastosis	3	
Atresia aortic valve	2	
Atresia pulmonary valve	1	
Atresia pulmonary artery	ī	
Unspecified	2	
Malformations digestive system		5
Atresia small bowel		
Tracheo-esophageal fistula	2	
Malformations genitourinary system	_	.4
Renal agenesis	1	•
Polycystic kidneys	2	
Hydronephrosis	1	
Malformations skeletal system	•	.1
Malformation entire spinal column	1	
Achondroplastic dwarf	1	
Multiple skeletal malformations	î	
Malformation skull and chest wall	1	
Other malformations	,	6
Diaphragmatic hernia	4	
Intra-abdominal hernia	1	
Fibrocystic disease of pancreas	I	
Total		67

infant must be continued as close to term as possible. After birth, infants born prematurely must be treated promptly and adequately. There must be complete and accurate prenatal and obstetric hospital records and adequate newborn records.

The present study is based on 19,910 live births in Hennepin County in 1952. There were 354 neonatal deaths in this series. For 333 of these deaths, adequate clinical records and completed neonatal committee reports were available from hospitals for analysis. A total of 320 mothers gave birth to 342 infants, including one set of triplets and 20 pairs of twins. Of the 20 pairs of twins, 9 individuals survived the neonatal period. Almost three-fourths of the mothers were gravida I, II, or III, and were between the ages of 20 and 35 years. Only one-third of

TABLE 8
Rh DETERMINATIONS ON 320 MOTHERS DELIVERED IN HENNEPIN COUNTY HOSPITALS IN 1952

		No.
Rh+		171
Mother — Father +	-	18
Mother - Father ?		29
Mother — Father —	_	5
Rh determinations		223 (70 per cent)
Not done		97 (30 per cent)
Immatures 72		1
Full term 25		
	Total mothers	320

these neonatal deaths were associated with obstetric complications — mostly abruptio placentae, placenta previa, antenatal bleeding of unknown cause, toxemias, polyhydramnios, and disease of the mother.

and 2500 gm, in weight. In the immature infants, almost half the deaths were due to abnormal pulmonary ventilation. The next leading causes of death were immaturity unqualified (no autopsies) and congenital anomalies. In the full-term infant, almost half the deaths were due to congenital malformations followed by abnormal pulmonary ventilation, erythroblastosis, and infection.

Almost one-third of the mothers did not have Rh determinations made, and almost one-fourth of the deaths were associated with inadequate Rh testing or inadequate or late treatment. Two-thirds of the immature infants died in the first twenty-four hours after birth and 80 per cent in the first forty-eight hours, but only one-third of full-term infants died in the first twenty-four hours and slightly more than one-half in the first forty-eight hours. Autopsies were done in almost

TABLE 9
ANALYSIS OF AUTOPSIES PERFORMED IN 333 NEONATAL DEATHS IN HENNEPIN COUNTY, 1952

	1000 gm. (2 lb. 3 oz.) or less		1000 gm. (2 lb. 3 oz.) 1001–2500 gm. or less (2 lb. 4 oz.–5 lb. 8 oz.)		Full term (over 5 lb. 8 oz.)		Total	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Yes	43	47.3	79	53.7	74	77.9	196	58.9
No	48	52.7	68	46.3	21	22.1	137	41.1
Total	91	100.0	147	100.0	95	100,0	333	100.0

Of the deliveries, 60 per cent were cephalic and 23 per cent were breech, reflecting the preponderance of premature deliveries, 71 per cent. Almost 10 per cent of the deliveries by cesarean section were because of serious obstetric complications. The relatively high incidence of neonatal deaths after section due to the high percentage of immaturely born infants suggests the necessity for adequate indication for section and proper surgical technic, the use of proper preoperative analgesia and anesthesia with maximum oxygen for the infant, as well as adequate resuscitation and gastric aspiration of the newborn.

Slightly more than one-fourth of the infants who died weighed 1000 gm. or less. In such cases, only a few can be expected to survive. An equal number were full-term, and fewer than one-half were immature infants between 1001

60 per cent of all neonatal deaths, but in 80 per cent of full-term infants and in only half of immature infants. The 50 deaths ascribed to prematurity unqualified — an unacceptable cause of death — did not have postmortem examinations, which in most cases would have revealed the anatomic cause of death. Every infant death as well as every fetal death should have an adequate postmortem examination.

#### CONCLUSION

Further reduction in neonatal mortality requires improvement of prenatal care, starting early in pregnancy; the prevention of preventable deaths in hospitals; and the reduction of mortality, particularly in early age and in low weight groups. A continuous and more extensive neonatal mortality study as well as an intensive study of fetal deaths will help reach this desirable objective.



Our readers will recall that two years ago we published a series of letters from Dr. Ancel Keys, head of the department of physiological hygiene at the University of Minnesota, to Dr. J. A. Myers and the readers of The Journal-Lancet. The letters were accounts of his medical observations during a year of foreign travel. Dr. Keys is now in Italy doing further research and studying in more detail cholesterol metabolism and its relationship to nutrition and cardiovascular disease. We are delighted to have the opportunity to present the third in another series of letters from him telling of his work and impressions in a foreign country.

## Notes from a Medical Journey

April 14, 1954

Universita di Bologna, Policlinico, Bologna, Italy

Dear Jay:

The work in Naples finished in a frenzy of work and we have moved north. Here in Bologna the peach blossoms are in full glory, but a top-coat is appreciated in the mornings and evenings. Spring is late and the Bolognese complain that by now they should have strawberries and nights when they can stroll the streets until midnight or later, chatting with friends and sipping coffee ("espresso") at the innumerable coffee bars.

Margaret and I drove here from Naples with Dr. Flaminio Fidanza and are attempting in a week to finish work that should take a month. Our friends here, Professor Sotgiu, Poppi, and Postelli, prevailed on us to study a sample of men of Bologna where the diet is higher in fats than in other parts of Italy and where heart disease is much more of a problem than in Naples. So now we are at it early and late with policemen as our subjects. By the weekend, when we must stop, we shall have covered about 60 men as our exploratory sample here. Our facilities, and the medical school in general, are much better than Naples, but always some motion is lost in setting up shop in a new place. In the meantime, our friends are determined to demonstrate the traditional hospitality of Bologna and so far we have not had a meal alone or an evening when we can simply go to bed. This evening we go to Modena (only 20 miles away) to dine with Dr. Coppo, the professor of Medicine at Modena. If we are lucky, we can finish at the lab by 7:30 and arrive at Dr. Coppo's home, a little breathless, by 8 p.m.

Our collaborators, except for the Italians, have all gone their several ways and we are receiving notice of their arrivals in Sweden, South Africa, England, Yugoslavia and the States. On the way out of Italy, Drs. Paul White and Gunnar Bjorck (of Sweden) stopped here in Bologna for six days and covered a prodigious amount of ground, making an inventory of the 1,156 patients they checked in the various hospitals and clinics. I have just received Paul White's report (14 closely written large pages),

from which it appears there is a high incidence of rheumatic fever and hypertensive heart disease and a moderate amount of coronary and myocardial disease. The difference from Naples seems clear enough and, together with the evidence of vital statistics and insurance company data, should allow some pretty firm conclusions, particularly when the parallel surveys in Sweden and the States (Boston, Albany, New York, and the Twin Cities) are finished. We shall have much to report at the World Cardiological Congress in Washington this September.

Bologna has been a great medical center for centuries and from what I have been able to observe, the medical school is still first class. Drs. White and Bjorck found good doctors, hospitals, and records. could mention other places we have been in the States as well as abroad which would not bear comparison. We were surprised to find more than 100 American medical students in the school here. They have a long grind of six years, but they seem to be pretty good boys and to be receiving good training. So far, about 20 Americans have taken their degrees here in the past two years and all have passed their State Boards, etc., at home with no difficulty. Most of them like many things about the life here, but agree that there is no place like home and have no idea of Settling down here in Italy. They enjoy the fine (but rich) food, the architectural beauties, the evidences of the continuity of history reaching back to the Romans, the excellent small Italian cars, and all that, but they do not really belong and miss friends and families.

On Sunday, Dr. Postelli showed us around a bit of Bologna with the kind of guidance that only a local scholar, imbued with the real love of his subject, can give. Of course, we saw the monument of Galvani and the frog and we were treated to all the details of the radiologic study of the bones of Saint Dominic. We visited the great orthopedic center and the tomb of Dr. Putti in the attached chapel at the "Istituto Rizzoli" and lunched with gastronomic delight at "Ristorante tre Galli d'Oro" (Three Golden Cockerels). Fortunately, the excellent local "Lambrusco" wine, which is red and naturally sparkling, is very light and long ago we learned to forego both appetizers and desserts, so we were able to look at the leaning towers of Bologna later without misgivings about our own equilibrium and even, at 9 p.m., to sit down to another notable meal at the "Ristorante Pappagallo in Brodo" (Parrot in the Soup).

(Later) My effort to write to you was interrupted by the arrival of another batch of policemen and then, at 1:30, we were driven off to have lunch at the top of the hill of San Luca far above the red tile and brick of Bologna, with all of the plain of Emilia stretching off into the golden haze of spring sunshine below. The local "Monte Albano" wine (golden, naturally sparkling, and just as light as Lambrusco) was the proper foil for the "lasagna gialla" (casserole of fresh noodles, cheese, chopped meat and butter), veal cutlet, baby fresh peas and diced, smoked ham, french fries, and oranges; but we followed up with concentrate of black coffee ("espresso") to give us strength for the long afternoon of work ahead. Now we are back at the Clinica Medica and I am pounding this out to the tune of the blower drying our cholesterol extracts and the chatter of half a dozen assorted Italian physicians and chemists who are

helping Margaret and Flaminio. Soon I must move the typewriter off the colorimeter table, because I think in a few minutes we can start the photoelectric readings on this morning's bloods.

I have little idea what detailed analyses of the Bologna data are going to show, but I do know: (1) the cops here are taller, on the average, than any groups we studied at Naples, (2) they are much like the Neapolitan firemen, heavy workers, and businessmen in fatness (i.e., much like men at home), (3) some have cholesterol values that would be considered very high on the Neapolitan scale, (4) 20 per cent of these men have very pronounced acne and old acne scars on the whole of the back, in spite of the fact that all are scrupulously clean and many are in the 40's and 50's. This is the sort of observation that probably has nothing to do with what we are after but does add the element of surprise that enlivens such explorations. When I called attention to the frequency of acne, the local physicians all chimed, "diet!," and went on to condemn the fatty diet of the region. All I know is that I have not seen this sort of thing before.

Tomorrow we have the last 15 policemen plus 5 prominent local businessmen (to lend our prestige to the idea of such men being "guinea pigs"), and I fear we must come back after dinner (another invitation, of course) tomorrow night and work until the small hours of the morning if we are to pack up the following day. Easter Sunday we shall spend at Ravenna with Dr. Bendandi of the medical department at Modena who is anxious to show us the Byzantine and Gothic glories of his home town. Then for a couple of days I think we shall have no commitments other than to turn up at Genoa in in time to put the car on the "Independence" on the 24th.

So it will not be long before we are home again and the midnight oil will burn under the stadium. While we are away, "Yoshka" Brozek has carried the burden as acting director of the Laboratory of Physiological Hygiene. He has done a fine job, but I know he will be most happy to hand over to me again. Henry Taylor, who held down the fort two years ago while we were in the field all year, is now in the hospital in Minneapolis, but I think he will be up and about, though not at work, by the time we are back. Apparently Dr. Kinsella did a fine job of decortication and now we may hope that Henry's troubles will be over.

Thus it goes. The older one gets, the faster time seems to move. And the more sense of urgency I have to do the things I think ought to be done. But now the ball is beginning to roll, I think, and other men of like mind are starting to work along the same lines in various parts of the world. Not that I have any missionary feeling but -- well, you know how it is; the research itch is incurable and whatever the pace, it is too slow in getting the answers.

With all good wishes to you and all in the "Land of the Sky-blue Waters,"

As ever,

ancel Kuys

### Section on PAIN

### Lobotomy in Terminal Cancer\*

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Lobotomy has been used to relieve suffering in terminal cancer patients for approximately ten years. During that period the first enthusiasm over the relief was followed by alarm at the personality alterations, and then by guarded approval as more limited operations accomplished the same purpose. In the course of these investigations, a number of paradoxical reactions were encountered, and a better understanding of pain mechanisms has been achieved.

Though relief of pain was noted early in their lobotomy studies by Freeman and Watts,1 they thought it due to the relief of nervous tension and obsessive preoccupation. However, in some patients who had serious organic diseases in addition to mental disorders, the symptoms referable to both conditions were abolished. Furthermore, in a few patients, relieved of their mental disorder by lobotomy and who later died of malignant disease, the fact was noted that they "bore their affliction with amazing fortitude." Consequently, beginning in 1944, Freeman and Watts<sup>2</sup> began applying prefrontal lobotomy to patients suffering from advancing carcinoma, as well as to other patients with unbearable pain.

This promising lead was soon followed by many surgeons, but it became evident that while the operation was undoubtedly beneficial for patients soon to die of their malignant disease, the results were less satisfactory in patients with painful conditions that did not threaten life. Such patients, after prefrontal lobotomy, became indolent and sarcastic; declined to go back to work; disregarded their social obligations; and sometimes overindulged in alcohol. This was the group of patients who threw doubt upon the desirability of lobotomy for the relief of pain, and thus surgeons were spurred to find ways

of relieving the pain without sacrificing those personality factors which made for effective living in the community. Severing peripheral nerves and dorsal roots had been tried with little success. Sympathectomy failed in many cases, while chordotomy was brought to a higher degree of development. Medullary and mesencephalic tractotomy, direct operations upon the thalamus and its entering spinothalamic tracts have succeeded in skilled hands. The postcentral cortex has been excised in cases of phantom limb with a fair proportion of satisfactory results. These operations are rather formidable procedures, too complicated to be undertaken in a patient with advanced malignant disease. Results are poor in the presence of psychologic factors and narcotic addiction.

Surgeons sought various means of avoiding the disagreeable personality alterations of lobotomy, while at the same time achieving relief of suffering. Scarff<sup>3</sup> employs unilateral lobotomy with fair success. This procedure is not as effective as bilateral lobotomy, but the other frontal lobe is operated upon if the pain recurs to a distressing degree. Scarff speaks of lobotomy as a relative barrier to pain. Topectomy has been employed by Pool,<sup>4</sup> LeBeau,<sup>5</sup> and others. The advantages claimed for topectomy, such as accuracy, hemostasis and so on, are not particularly reflected in the statistics. Major operations such as these are serious in debilitated patients. The death rate in pain patients is higher than in mental patients. The surgeons using topectomy, however, have revealed that the quantity of tissue removed, rather than its location in the frontal lobe, determines the result. Scoville<sup>6</sup> found that small resections or undercuttings have often relieved the symptoms while at the same time the patients preserved a satisfactory reaction to their surroundings. Operations on the

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Fig. 1. Horizontal section of hrain from patient dying of cancer a week after transorbital lobotomy. Subcortical incisions interrupt the thalamofrontal connections as they bend around the anterior horn of the ventricle.

cingulate area for the relief of pain have not been satisfactory either from the standpoint of safety or of relief. Injection of Novocain into the frontal white matter<sup>7</sup> often achieves transient relief. Amounts of from 5 cc. to 30 cc. of 1 per cent solution can be injected through trephine openings or by the transorbital route. How much relief is due to the drug and how much to the pressure of the injected mass has not been studied. This method has limited application in cancer patients. Transorbital lobotomy, according to Williams and Freeman,<sup>8</sup> is the operation of choice in advanced carcinoma because of its simplicity, effectiveness, and freedom from either physical or mental complications.

Transorbital lobotomy can be performed under local ancesthesia in many patients suffering from advanced cancer. Those who are too apprehensive require no more than ten minutes of Pentothal anesthesia. The points of the leukotomes are inserted beneath the eyelids, 3 cm. from the midline, aimed parallel with the bony ridge of the nose, and driven to a depth of 5 cm. from the margin of the upper eyelid. Here the handles are separated a total of 45 degrees and driven 2 cm. deeper. The handles are touched

over the nose, a maneuver that severs the white matter beneath the frontal convexity, and again separated 45 degrees, making a "W" with the nose. This oblique position avoids the arterial branches over the insula. The handles are then elevated through an arc of from 30 degrees to 60 degrees, depending upon the severity of the pain. During this mancuver the orbital plate sometimes gives way with a snap. The points of the instrument are aimed at a narrow band of fibers that bends around the anterior horn close to the ventricle, between the head of the caudate nucleus and the insula (figure 1). The incisions in transorbital lobotomy are susbtantially equivalent to those of bimedial lobotomy as performed by Poppen<sup>9</sup> and also to those produced by Grantham<sup>10</sup> by electrocoagulation. Possible damage to the caudate nucleus, or penetration into the ventricle is of no practical significance.

Recovery from transorbital lobotomy is prompt. There are no wounds to dress; the ecchymosis of the lids subsides in a few days; and the patient needs little in the way of special care. Some patients can return to their homes the day after operation. Shock does not occur, and complica-

tions such as hemorrhage are rare.

The mental state of the cancer patient after operation upon the frontal lobes is gratifying. Instead of the continual state of torment which finds its expression in moaning and demands for drugs, there is relaxation and easing of tension. The patient can smile again, can eat, and sleep and take interest in the activities of the household and the visits of relatives. The serenity with which these patients lobotomized for pain view the approach of death is also remarkable. I have repeatedly engaged patients in a discussion of their future prospects. They are quite realistic. They express no hope of getting well, yet they have no fear of death. They do not wish to die, but they accept the inevitable with remarkable calmness. Sometimes an element of flippancy enters into the replies which is a strong contrast to the dreadful state present before operation.

Operations on the frontal lobe do not affect the threshold of pain sensation. This fact has been proved by quantitative measurements by Chapman and associates<sup>11</sup> who showed also that lobotomized patients, at least for a while, even show a reduced tolerance for induced pain. Watts and I reported<sup>12</sup> the case of a patient who underwent prefrontal lobotomy for terrible suffering in connection with recurrent carcinoma of the larynx. This man was relieved of his pain and fear of suffocation, and lay quietly in bed,

relaxed and smiling. When fecal impaction developed a week later, it was necessary to remove it by a finger in the rectum. During this maneuver the patient struggled violently and screamed in anguish, so that he had to be overpowered in order to muffle his yells. The moment the finger was withdrawn, the patient again became relaxed and smiling. He was unable to tell why the experience had been so harrassing to him nor why he had reacted so violently. The painful sensation seemed to be an experience of the moment, and the factors of anticipation and of recall, of living with pain either in the future or in the past, had been abolished.

Frequently, when patients are asked about the pain, they say it is as bad as ever, but they say this with a smile, and turn the conversation to something else. The power to concentrate upon their misery is lost. Freed from this continual self-examination, the pains are spoken of as twinges. In patients who have been under heavy doses of opiates, withdrawal phenomena may occur without particularly exciting the patients' attention. While this has not been frequent, withdrawal has apparently caused serious symptoms in a few debilitated patients within two or three days after lobotomy. In the patient with laryngeal carcinoma, the condition was recognized just in time to prevent fatal consequences. This was before the impaction developed. Since the patient did not complain, he received no morphine at all. When seen the next day he was seriously sick, vomiting, sweating, with high fever and blood pressure reduced almost to the shock level. Morphine was administered and the symptoms cleared within minutes, the temperature coming down inside of six hours. This type of patient requires morphine for a day or two after lobotomy, after which the dose can be gradually reduced. Other patients can be taken off morphine promptly without danger. A factor that contributes so

much to the serenity of the patient in the final period of carcinoma is the freedom from the toxic manifestations of large doses of opiates.

Lobotomy as a relative barrier to pain has previously been mentioned. Pain due to generalized bony or visceral metastasis is rather readily and completely relieved. When the pain is due to infiltration of nerve roots or plexuses, the relief is less satisfying. On the whole the "unbearable" pain of late cancer is a pain of low intensity. If the pain were of extreme degree, the patient would go into shock and quickly succumb. A ready test for the intensity of the pain is to induce pain. Bending the fingers backward is as good a test as any. When the patient says that the pain in the fingers is worse than that in the body, the physician can judge the severity by trying the same test on himself or upon the intern. Individual sensitiveness to pain may also be tested first by pressing on the mastoid processes in order to accustom the patient to the sensation of pressure, and then by shifting the thumbs to the styloid processes and again pressing. When a patient complains of pain from a cancerous lesion but is insensitive to styloid pressure, indeed the pain requires relief.

Lobotomy alters the attitude of the patient toward his pain. The pain of terminal cancer is compounded of the foreknowledge of death, the hopelessness that comes with an incurable disease, and the endless vista of pain to come. Therefore, lobotomy is more effective in those patients whose emotional reactions to the disorder are as serious as those concerned with pain itself. Perhaps it would be better to say that lobotomy relieves the suffering of terminal cancer. When suffering is abolished, even though pain may still be perceived, an objective has been gained. And certainly, in a patient faced with death from advancing carcinoma, some degree of equanimity, if not euphoria, is well to have in order to bear the terminal stages.

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# Pain Problems of the Neck, Shoulder Girdle, and Upper Extremity\*

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Many problems beset us in our attempts to relieve pain. Chief among these are difficulties in localizing the source of pain and inability to apply effective therapy. This applies especially to the region of the neck, chest, shoulder girdle, and upper extremity, because of the many sources both visceral and somatic, which can refer pain to identical areas. Many patients have been subjected to long periods of therapy with no relief of pain. The reasons for these failures are: (1) failure to localize the source and nature of the pain so that studies and therapy were erroneously directed to areas of referred pain; (2) use of forms of therapy which were not indicated, the most frequent of which were nerve block and local injections; (3) confusion between nerve, blood vessel, and visceral pain, especially about the head, neck, upper extremity, and interscapular region; (4) incomplete examination and studies; (5) the presence of two or more lesions which resulted in overlapping, confused clinical pictures; (6) failure to recognize postural defects and mechanical lesions when all studies were negative; (7) lesions not sufficiently developed to become apparent during the course of diagnostic studies, or because the pain was functional; (8) failure to do serial studies with continued or progressive pain, especially in diagnosing serious organic disease where the evidence was not demonstrable for weeks or months; (9) failure to do special studies; (10) psychogenic pain and malingering; (11) pain of undetermined origin; and (12) inability to obtain relief by any available means.

Although this paper is concerned primarily with somatic pain, visceral aspects are considered in order to clarify the differential diagnosis.

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In presenting this material we are limiting our observations to a few of the conditions often encountered over a period of years. These include: occipital pain, brachial plexus pain, scalenus anticus syndrome, severe headache, and dystrophic changes which may complicate the picture of cervical spine lesions. Also included are new observations on interscapular pain, which has long been a problem. Trigger points and muscle spasm are discussed, and a new method of traction therapy is reviewed.

#### HISTORY

The history is often revealing. Important aspects of pain include: location, duration, intensity, character, depth, circumstance of onset, relationship to visceral disturbances; factors which reproduce, aggravate, or alleviate; whether the pain is constant, recurrent, or periodic or stationary, improved, or progressive; symptoms of sensory or motor disturbances; weight loss and other somatic factors.

#### OBJECTIVE EXAMINATION

Examination and diagnostic procedures include: localization of the affected levels and consideration of both somatic and visceral possibilities; determination of the presence, absence, pattern, and location of tenderness which accompanies the pain; ability to reproduce or intensify pain by stimulation of musculoskeletal structures, including compression and traction maneuvers; a complete general and neurologic examination; maneuvers to localize painful musculoskeletal structures; and use of nerve block and local anesthesia as diagnostic and therapeutic procedures.

#### STUD1ES

Routine studies. Temperature range; roentgen examination of the cervical and dorsal vertebrae, the chest, shoulder joint, and scapula; urinalysis;

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complete blood count; blood sugar; urea nitrogen and uric acid; serologic studies; and sedimentation rate.

Special studies. Bence-Jones, basal metabolic studies, phosphatase studies, biopsy, sternal puncture, cultures. Spinal tap for hydrodynamics and detailed study of the spinal fluid, myclogram, arteriogram, other special investigative procedures, and, at times, repeated physical and laboratory studies are necessary.

#### EVALUATION OF SOMATIC PAIN

We present a clinical concept of pain as it applies to interpretation of the objective examination. This has often proved to be of value in determining whether the origin of the pain is nerve, blood vessel, viscus, or musculoskeletal structure.

Part of this concept is based upon the characteristics of tenderness. The presence and even the absence of a sensitive area is of clinical significance. When spinal sensory nerves are directly irritated, tenderness spreads distally from the point of irritation to the periphery, conforming to a pattern. Therefore, when entire skin sensory segments become tender and painful, it indicates irritation of the roots and/or nerve trunks. The stimuli of visceral disease, on the other hand, may produce segmental pain, but not segmental tenderness. With visceral referred pain, tenderness may be completely absent unless the parietal pleura or parietal peritoneum becomes irritated. If this happens, irregular areas of skin hyperesthesia usually develop at points overlying the irritated pleura or peritoneum. Also, in visceral referred pain, which does not irritate the pleura or peritoneum, areas of spot tenderness may develop due to a "viscerocutaneous reflex." În neither case can a recognizable pattern of tenderness be elicited.

While this general concept is not infallible, and exceptions occur, the method has been very satisfactory for clinical interpretation of pain.

Somatic pain as a whole may be divided into local and radiating pain. Local pain usually offers few difficulties, since the pain, tenderness, swelling, limited motion, and so forth are confined to a single area. Radiating pain, however, often presents a problem. In such cases, the pain may manifest its greatest intensity in areas far removed from the actual source of irritation. As a result, many patients have studies and therapy directed to the area of complaint without benefit.

Radiating pain may be divided into 2 groups, transmitted and reflex.

Transmitted pain. The pain is carried along the course of a nerve with either a segmental or peripheral skin pattern. This type implies root or trunk irritation in the course of the nerve either by intrinsic nerve changes or by contiguous structures along its course. The pattern of distribution is determined by eliciting tenderness. Examples of this type of pain are chest and abdominal-wall neuralgias; sciatic pain due to root, trunk, or peripheral branch irritation; occipital neuralgia; and brachial plexus neuralgia. Sensory or motor disturbances, such as anesthesia, hypalgesia, trophic changes, motor involvement, and diminution or absence of reflexes may or may not be present. In exceptional cases, pain of the transmitted type may have no pattern tenderness.

Reflex pain. This pain is referred from an irritated somatic structure to a distant region within the same segment. An example of this type is pain which is referred from the hip joint tendons to the lower leg. The region of referred pain is not associated with pattern tenderness. Reflex pain may also be referred from muscles and other local structures to distant regions of the same dermatome or contiguous levels with absence of pattern tenderness in the zone of reference. Reflexes are not diminished or absent. Motor weakness and true atrophy do not develop. In other words, the nerve pathways are merely acting as carriers of the pain impulse without the nerve actually being involved in a degenerative process.

In occasional cases, the region of referred reflex pain may be associated with a small extremely sensitive area which has no recognizable pattern. This type of pain obviously cannot be regarded as transmitted. These sensitive regions are possibly due to a bombardment of impulses to the spinal cord from the irritable focus of the lesion, thus affecting the sympathetic components of that particular segmental level, or contiguous levels, and the resultant irritation is expressed in the periphery by tenderness and pain which are probably vascular in origin.

Based upon the objective findings, then, the patient's complaint can be classified into one of these groups. This classification determines the areas to which study and therapy are to be directed. The local type presents the least difficulty, since studies and therapy are applied to the area of complaint. In the transmitted type, attention is directed to the spine and its sur-

rounding areas if segmental nerve tenderness is present. In the reflex type of pain, the segments involved are identified and all skeletal structures receiving nerve supply from this level are carefully examined for a local lesion which produces the radiation. We wish to stress that reflex reference of this type may also have its origin from visceral sources, and may be impossible to differentiate even when studies are completed for this purpose. Any of the foregoing types of pain may coexist so that one type overlaps another.

#### BRACHIAL PLEXUS PAIN

In spite of the fact that many local and systemic conditions are responsible for brachial plexus pain, only a few comprise the majority; namely, osteoarthritis, degeneration and herniation of intervertebral disks, scalenus anticus syndrome, diabetic neuritis, malignancy, trauma, and acute infections producing a toxic neuritis. Even in this limited group, the majority of cases are mechanical lesions — herniated intervertebral disks, osteoarthritic lesions, scalenus anticus syndromes, and other mechanical compressive lesions.

#### DIFFERENTIAL EXAMINATION

Shoulder joint lesions are, as a rule, evidenced by limited or painful motion and localized tenderness. If the shoulder joint is negative, the cervical spine is examined for limited motion or "painful catch" through the full range of motion.

Traction and compression maneuvers are important diagnostic procedures. If downward compression of the cervical spine intensifies and reproduces the radiating pain, probably the cause is vertebral rather than extravertebral. If causes of pain were in muscle or other soft tissues about the cervical spine, compressing the cervical spine would be expected to relax these tissues and ease the pain. Therefore, when compression of the spine accentuates the pain, we can assume, until proved otherwise, that the pain is vertebral in origin. On the other hand, if pain were in the extravertebral soft tissues and the painful structures were extended or stretched, pain would be expected to increase. With a cervical disk, however, the reverse is true. Stretching the neck often gives immediate complete relief. At other times, this procedure may increase pain or numbness in the shoulder, arm, and hand. Intense pain in the scapular or interscapular region, anterior chest, shoulder, or axilla, associated with upper limb pain, can be due to a protruding cervical disk or other root



Fig. 1. Traction chair devised and developed by author for use in herniated cervical disk, osteoarthritis and other conditions in which traction is indicated. Traction is intermittent, approximately 5 cycles per minute with a peak dwell for several seconds during each cycle. Degree of pull is adjustable and visible on scale. Because of intermittent action, the patient can tolerate heavy traction, 25 to 50 lb. Relief of pain is rapid.

compressive or space-taking intraspinal lesion. Here again, treating the areas of referred pain is of no value. Roentgenograms of the cervical and dorsal spine, scapula, and chest should be taken to rule out other pathology. Peripheral points of pain reference and neurologic examination aid in localizing the level.

If the examination using these procedures is negative, and if there are no positive signs of

nerve involvement, search is made for a local lesion. If the brachial plexus and scalene muscle are not tender to pressure, if there are no palpable changes in the supraclavicular space and no tenderness in the painful periphery, if vascular studies are normal and all signs of nerve involvement are absent, search should be made for radiation of a reflex nature, either from skeletal structures of the shoulder girdle or from structures of the upper extremity. Reference of pain via the phrenic nerve should be excluded. The association of pain with motion or change of position increases the likelihood that its origin is skeletal. If the pain is not related to motion or position and examination of the skeletal structures is negative, visceral referred pain should be suspected and possible sources should be investigated. Spinal and arterial contrast studies may be indicated.

#### MECHANICAL COMPRESSIVE LESIONS

Pain in these conditions varies. It may disappear spontaneously. Some patients are relieved by rest in bed and analgesics. Others are relieved by use of 5 to 12 lb. of traction as a constant hanging weight. However, a large group of patients undergo many forms of therapy, including constant traction, without relief of pain. In this group, heavy traction has provided the most rapid relief.

In a series of over 100 cases we employed test traction. Nearly all these patients exhibited signs and symptoms of a herniated cervical disk. A head halter with a scale attached was applied and pull was exerted, a few pounds at a time up to 50 lb., and reactions noted. In over 40 per cent of the patients, immediate complete or partial relief was obtained for the duration of the pull. In most patients relief occurred at 35 to 40 lb. In a series of patients who had x-ray films taken during traction, demonstrable measurable widening of interspaces was noted, on the average, when 25 to 45 lb. of force was used. Recently we have used a motorized apparatus (figure 1) delivering intermittent traction with approximately 5 cycles per minute going from zero to the desired pull. At the height of the pull, force is maintained for approximately half of the cycle so that more than 50 per cent of the time the patient is obtaining the desired traction. The pull returns to zero with each cycle, removing pressure and allowing decongestion of the tissues. This type of therapy has proved so satisfactory for the mechanical type of brachial plexus pain that we have practically discontinued use of brachial plexus block. Traction, scalene infiltration with procaine, heat, and support when necessary have been the essentials of treatment. Heavy traction may be administered at home, using a head halter, scale, and pulleys (figure 2). Cases resistant to this routine are hospitalized and traction is administered as an all day procedure, allowing the patient to stop the apparatus at will, if a rest period is desired. The traction pull should be aligned so that pull is exerted with the cervical spine in flexion.

#### PRECAUTIONARY MEASURES IN TRACTION

1. Patients who present findings of a midline disk should be subjected to traction very cautiously or not at all because of possible cord damage. This precaution applies especially to strong traction force.

2. Traction should be applied with caution in pronounced hypertension because during the pull of heavy traction the side straps of the halter compress the jugular vein with resultant increased intracranial pressure.

3. Patients with acute torticollis or myositis of the neck muscles experience increased pain during traction without benefit.



Fig. 2. Bow-scale, a new unit taking place of a traction-bar and scale. This device in combination with a new type swivel-halter eliminates much of the discomfort in the temporomandibular joint during heavy traction. Arrows denote directions of force in spring bar.

4. Malignancy or other serious pathologie disorders are contraindications to traction. Roentgen studies of the cervical spine, shoulder girdle, and chest should be routine prior to treatment. Heavy traction in the presence of a metastatic lesion may cause severe damage. Patients who receive periods of traction and show no improvement should have roentgenograms repeated.

#### SCALENUS ANTICUS SYNDROME

Primary scalene syndromes are those in which symptoms follow intrinsie disturbances of the anterior scalene muscle — spasm, hypertrophy, or myositis. Reflex scalene syndromes are those due to irritation of structures other than the anterior scalene muscle. Both types produce pain by eompression of the subclavian artery and/or components of the eervicobrachial plexus. Both types should be differentiated before surgery is attempted. Primary types obtain relief with procaine injection and surgery, but the reflex spastic types obtain only partial relief, and the underlying eause must be sought.

Among lesions which eause reflex scalene spasm are intraspinal space-taking and inflammatory lesions of the cervical spine, radiculitis of the fourth to seventh cervical nerve roots, malignancy of the cervical spine, disease, trauma, or inflammation of skeletal structures supplied by the fourth to seventh cervical segments including the central diaphragm and pericardium.

Signs and symptoms which suggest an anterior scalene syndrome are brachial plexus pain, fullness of the medial supraclavicular space, a tense sealene musele on the painful side, weakness of the grip, sensation of heaviness in the arm, and changes in arterial amplitude. Increased skin temperature, eausalgie areas in the dorsum of the lower arm and wrist, prominent veins, and thickened fingers are rarely present. These signs are characteristic of compression of the subelavian vein.

Compression of the anterior sealene musele just above the elavicle eauses intensified pain and distress as compared to pressure on the non-painful side. In this test, the thumb is placed about an ineh above the elavicle forcing the clavicular head of the sternoeleidomastoid musele medially. Pressure is made upon the sealenus musele on the nonpainful side, and then compared to the painful side. In all eases, tenderness is greater on the affected side, and pressure intensifies the pain and distress.

This maneuver, when it causes pain, has been regarded as a presumptive sign. However, the

procedure is unreliable and may be compared to the straight-leg-raising test for seiatic pain. It confirms the presence of pain along a specific pathway but does not give us a definite diagnosis. This technic also gives a positive response in eases of ruptured cervical disk, osteoarthritis of the cervical spine, or in other lesions which irritate components of the brachial plexus. Pain is probably due to pressure or traction upon the nerves. With a spastic sealene muscle, this response can easily be mistaken for that of a primary scalene syndrome.

Inability to obtain relief by surgical intervention is ehiefly caused by failure to distinguish between primary and reflex types of spasm.

Reflex contractures often present signs and symptoms which are identical to those of a primary scalene syndrome. There may be fullness of the supraclavieular space with a tense tender sealene muscle, and the grip is weakened. Pain, numbness, and tingling of arm and hand may be typical. Relief may be obtained by elevating the arm. There may be changes in arterial amplitude, and manual compression of the lower end of the sealene musele causes intensified pain and distress. In spite of the faet that typical signs are present, we eannot always be sure whether we are dealing with a primary or seeondary syndrome. If surgery is performed at this point without further investigation, the patient may fail to obtain relief.

At present, the most dependable method of differentiation appears to be the test originally introduced by Gage in 1939. This procedure eonsists of an injection of 5 cc. of 1 per eent proeaine into the anterior scalene muscle. Care must be taken not to infiltrate the phrenic nerve or brachial plexus. Relief of pain occurs after five to ten minutes. Others have used as much as 10 ee. This technic was discarded after a short period of time, because anesthesia of the sympathetics as well as partial anesthetization of the brachial plexus were frequently encountered. To lessen incidence of brachial plexus and sympathetic anesthesia, we modified the technic. Instead of 5 ee. of the 1 per cent Novocain, 1.5 to 2 ce. was injected, and we attempted to localize the musele infiltration more accurately. A ¾- to ½-in, needle is used to prevent too great a depth of injection. The time element is reduced to three minutes. In most instances, by forcing the clavicular insertion of the sternocleidomastoid medially, the lower portion of the scalene antieus muscle can be isolated between the two fingers so that it ean be directly infiltrated.

#### HYPODERMIC NEEDLE TECHNIC

The patient's head is brought to the painful side to relax the sternocleidomastoid muscle. The clavicular head of the sternocleidomastoid muscle is pushed medially, at the same time forcing the fingers inward and downward. The patient is instructed to take and hold a deep breath. As inspiration takes place, the scalene muscle can be felt to tighten. The muscle is straddled by two fingers, and, at the same time, the head is tilted toward the opposite side and slightly extended. The fingers are forced inward on either side of the muscle, so that the pressure causes the muscle to bulge forward. A %- to ½-in. needle is inserted between the fingers directly into the muscle, and 1.5 to 2 cc. of 2 per cent procaine are injected. In patients with short, heavy necks or with a tight sternocleidomastoid muscle, the anterior scalene muscle is sometimes difficult to separate so that an accurate infiltration can be made. These patients may need an injection on more than one occasion in order to be sure a satisfactory infiltration has been made.

In primary cases, the response is rapid. The patient loses the heavy sensation, pain disappears, tingling stops, and the grip is restored to normal — all within a matter of minutes.

The immediate effect after injection determines whether or not a primary syndrome is present. If pain disappears completely within a three-minute period without signs of sympathetic or brachial plexus anesthesia, a primary syndrome may be suspected. The more rapidly pain disappears, the more likely it is that a primary condition exists. A re-examination is important the moment the patient states that the pain is relieved. Deep pressure or percussion over the cervical spinous processes with a hard rubber hammer often elicits acute tenderness in the lower cervical spine. If the patient has relief of pain after injection and these tender points are found, or if the pain develops on flexion, extension, or rotation of the spine during the relief period, a lesion in the lower cervical spine should be suspected. The conclusion should not be drawn that the condition is a primary scalene syndrome. The effect of a series of infiltrations should be noted, and whether or not pain completely or only partially disappears after each infiltration. Rotation of the neck is not sharply limited by a painful catch to either side when a primary scalene syndrome is present. This is usually due to other pathology in or around the cervical vertebra. A scalene syndrome does not cause stiffness of the cervical spine. Painful or

limited motion of the shoulder joint is not caused by a primary scalene syndrome.

The best conservative treatment of a primary scalene syndrome is repeated procaine infiltration. Postural correction and physical therapy are of additional value. If, after 4 treatments, sustained relief is not obtained, the muscle should be transected. If progress is made, injections may be continued. If progress becomes stationary, the amount of residual pain should be the guide for surgery. Over 80 per cent of patients obtain clinical relief by repeated infiltration.

In a secondary scalene syndrome, the muscle should not be sectioned. Infiltration of the muscle gives only partial relief. Search must be made for the underlying lesion. Roentgen studies should be made of the cervical spine, upper dorsal spine, scapula, chest, and shoulder joint.

No doubt in some patients the differential procaine test may fail to give the desired information. In these instances, failure could be due to anatomic variations. For example, pain has been reported duc to compression of a nerve root by a scalenus minimus muscle. In another patient, the lateral edge of the cervical fascia became thickened and hardened and compressed the third portion of the subclavian artery. The patient obtained no relief until this fascia was released. Anomalies of the first rib have been reported to be the cause of compression and irritation. It is conceivable that edema due to compression, involving either the nerves or other structures which might produce pain, could not subside in the short time required to produce the anesthesia and release of the anterior scalene muscle. However, all of these variations do not appear to be common, since, in most instances, we were able to obtain rapid relief of symptoms which appeared to be an anterior scalene syndrome. This relief, of course, does not always apply to those cases in which there is direct compression, such as a cervical rib or where vascular compression is present due to narrowing of the costoclavicular space. The rapidity and degree of relief depends on factors causing the compression and on the rigidity and fixation of the structures involved. In one instance, a patient obtained complete relief after infiltration of the anterior scalene muscle, and we would have presumed that this was an anterior scalene syndrome had we not felt a nodule behind the muscle which proved to be a metastatic lesion due to a primary growth in the lung. Unless signs of vascular compression or changes in arterial amplitude are pronounced, they do not appear to be of positive value. If found in the rest position, these changes appear to be of more value. In many instances, a decrease in the pulse volume can be produced in patients who do not suffer pain by applying the various maneuvers which are supposed to be diagnostic of the scalenus anticus syndrome. Those cases in which anatomic variations have produced the symptoms which cannot be released by a scalene infiltration cannot be accurately diagnosed until these structures have been exposed and the points of compression observed. Surgery of this type is, of course, exploratory.

In reflex syndromes, the diagnostic injection is of great value because it erases the overlap of the scalene picture and allows better localization of the original point of stimulation. In some instances where two lesions exist, one overlapping the other, a correct diagnosis is impossible with-

out use of this procedure.

#### MULTIPLE OVERLAPPING PAIN SYNDROMES

In this area, more than one lesion as the source of pain is not unusual. A painful cervical spine lesion, for example, may initiate a reflex scalene contracture with overlapping nerve and vascular Painful stimuli may cause a condition pain. which appears to be a reflex dystrophy with shoulder-joint symptoms. Similar changes may take place in the elbow region, usually at the point of attachment of the extensor muscles, at and medial to the external condyle. Add to this the severe occipital, frontal, temporal, and orbital pain, which frequently complicates a cervical spine lesion, and we have a syndrome with 5 distinct areas involved. Stopping the pain in the cervical spine itself does not control the other areas, especially the headache, shoulder joint, and elbow. In fact, each of the complicating factors are at times capable of maintaining a self-perpetuating pain cycle, so that therapeutic measures necessary to provide relief vary with each factor. Whatever the mechanism, these secondary tissue changes do take place, and often remain painful after the primary cause of pain has been relieved. After successful treatment of a herniated cervical disk, the neck and shoulder girdle pain disappears; head and neck motion is free and painless; and compression and traction maneuvers are negative. The patient freely admits that the entire upper area has cleared up but that severe pain is still present from the elbow to the finger tips. This pain is not generally recognized as being now independent of the cervical disk lesion. Unless these clinical aspects are recognized and treated, relief of pain in this group is not satisfactory.

Let us suppose the original lesion is a herniated cervical disk with all of the complicating factors. The cervical spine will require traction and, at times, support as well as other physical therapeutic measures. Anterior scalene muscle infiltration with procaine often provides additional relief. The occipital pain and headache is nearly always vascular in character. For this we have used occipital periarterial infiltration of procaine and oral Benadryl. The shoulderjoint symptoms which develop as a result of the dystrophic changes may require early stellate ganglion infiltration, suprascapular block, local infiltration of the shoulder cuff, stretching, and other methods before the pain entirely subsides and motion is restored. Often the area of the extensor muscle attachment at the external condyle must be infiltrated with procaine, and a supporting cuff from the wrist to the forearm provided.

This clinical picture is not rare, although either or both the headache and a reflex scalene syndrome as an additional complication is more common. Unless all factors are considered in dealing with pain problems, we will be plagued with failures. No particular method of therapy successfully deals with all problems.

#### MUSCLE SPASM

The concept that constant mild cervical traction is necessary to overcome muscle spasm for relief of pain is questionable. The bulk of evidence points to the fact that spasm which is associated with a "mechanical" painful neck, such as a herniated cervical disk, is reflex in nature and does not cause pain. Symptoms are due to compression of the nerve root or other pain sensitive structures, so that the resultant effect is a sensory-motor or motor-motor reflex which results in spasticity of the muscles supplied by the particular root segment involved.

The reasons for this opinion are as follows: When a herniated cervical disk is present and the paraspinal muscles are spastic with a loss of lordosis, compressing the cervical spine by applying strong pressure downward upon the head shortens the muscle but increases the pain. Tilting the head laterally to the painful side and pressing downward should relax or shorten the muscles on the spastic side. Instead of relief, radiating pain usually increases because of compressive factors which are the source of pain.

In approximately 40 per cent of herniated cervical disks, if a traction force of 30 to 45 lb. is applied, pain is instantly relieved, either completely or partially, the moment the force is applied, and pain returns as soon as the force is released. Theoretically, if a muscle is spastic and painful, a sudden pulling force upon this muscle should produce increased pain and spasticity. However, the reverse occurs; the pain either stops completely or partially, which is further evidence that the muscle itself is not producing pain nor adding to the pain cycle.

In addition to this, many patients who had been hospitalized and treated by conventional light weight constant traction without relief, obtained immediate or pronounced relief as soon as test traction with heavy force was applied. When this occurred, it took place as soon as the force was applied - a matter of seconds - certainly too soon to say that muscle spasm was overcome. These patients, almost without exception, obtained excellent results with the use of heavy intermittent traction.

#### OCCIPITAL PAIN AND HEADACHE

Pain in the upper cervical spine, the occipital, parietal, temporal, orbital, and facial regions is not uncommon in association with a protruding cervical disk or other painful lesions of the cervical spine.

Apparently, two mechanisms may be responsible for the projection of pain to these areas. One is by way of the descending or spinal root of the trigeminal nerve, which has been demonstrated to descend for several segments in the cervical cord, and the other appears clinically to be vascular in type. In our experience, the vascular pain appears responsible almost always.

#### SYMPTOMS

Usually the complaint is pain in the occipital and/or parietal, frontal, and temporal regions. The scalp may be sore to combing and brushing. Facial pain or a sensation of numbness or tingling in the cheek may occur. Pain may be unilateral or bilateral. A sense of painful pressure behind the eyeball on the affected side is a common symptom. Discomfort may be felt in the ear in the form of fullness, pressure, or pain. The pain may radiate to the neck or shoulder. In some patients, occipital pain is either absent or minor, with the major complaint being in the temporal and orbital regions. In others, the maximum pain is occipital with little discomfort in the frontal or temporal region. At times a sensation of a tight band around the head is present. These are symptoms common to migraine, vascular tension headache, histamine cephalgia, posttraumatic headache, and vascular headache in general.

#### SIGN'S

Although location of pain may vary, and characteristic painful areas are not always present, an acutely tender point in the occiput is often found in vascular headache, approximately midway between the tip of the mastoid and the midcervical spine, on the painful side if unilateral and on both sides if a bilateral headache is present. Rolling the tissues at this point, and using deep pressure at the same time frequently causes reference of pain to the ear, face, orbit, frontal, or temporal region, which reproduces pain in the areas of complaint. Firm, sustained pressure may ease the pain. In addition to the tenderness in the occiput, tenderness is found over the superficial temporal and carotid arteries. The carotid tenderness is often, but not always, present. In sceking the presence of tenderness over the superficial temporal artery, pressure in itself may not make this sign apparent. Sharp tapping over the artery, however, usually causes a pronounced reaction of sensitivity as compared to the nonaffected side or other control areas. Tightening of the scalp and neck muscles may also accompany the headache.

Because the occipital artery has its location in this region and since no nerve in this region can produce radiation to the areas mentioned, plus the fact that other vascular points are simultaneously tender and anesthetizing this vessel often stops pain in all the referred areas, we feel the occipital artery often acts as a reflex-releasing mechanism in this region. When occipital pain is present, search should be made in the arterial regions for evidence of tenderness, to establish the diagnosis of vascular pain. It is of interest to note that the act of rubbing and irritating the sensitive superficial temporal or carotid arteries does not produce radiating pain as it does when

the occipital artery is so stimulated.

Irritation of nerve roots or other somatic structures of the cervical spine may give rise to reflex stimulation of the sympathetics, so that vascular headache may be precipitated by painful conditions which affect the cervical spine, especially in patients who are predisposed to vascular tension headache. With the onset of pain in the cervical spine, the vascular headache often becomes a prominent feature of complaint. In the majority of cases, history revealed that the patient had suffered tension headaches off and on for years.

Although no direct connection of nerve roots and corresponding sympathetic ganglia in the cervical spine exists, this phenomenon often occurs and is distinctly vascular in character. Reflex stimulation of the sympathetics by way of spinal cord probably takes place in the same way that sympathetic reflex dystrophics occur.

The following is one of many of the typical headaches we have observed.

#### CASE REPORT

A 38-year-old male complained of severe leftsided brachial plexus pain for two months. The signs and symptoms were typical of a herniated cervical disk. Relief of the brachial plexus pain was obtained by intermittent cervical traction using 45 lb. and by infiltration of the left anterior scalene muscle with procaine. In addition, he had had an almost constant sensation of bilateral pressure in the occiput, associated with pain in both temporal regions and a fecling of eycball pressure, with a sensation of burning and "sandy feeling" in the cycs. On the initial visit, a bilateral occipital infiltration was done with procaine. Within a few minutes, the headache and eychall pressure on both sides had completely disappeared. The abnormal sensation in the eyes completely disappeared. The patient had no headache for three days, and then expericaced a mild recurrence, but not in the eyes. The injections were repeated and the patient had relief for about a month. Benedryl, 50 mg. at bedtime, was prescribed. Relief lasted several months and the injection was again repeated.

#### TECHNIC OF INJECTION

A point midway between the mastoid tip and midcervical spine is palpated for a maximum point of tenderness. The area is marked with ink. Palpation is repeated to confirm the most acute point of tenderness. The area is shaved, a procaine skin wheal raised, and 3 cc. of 2 per cent procaine infiltrated until bone is contacted. This area should be palpated after the infiltration to be sure that all local tenderness has disappeared. If tenderness completely disappears and the headache persists, repeated infiltration usually is of no benefit.

Infiltrating this area with procaine may, in some instances, cause complete disappearance of pain within a few minutes. This condition is differentiated from occipital neuralgia by pain reference to the frontal, temporal, orbital, facial,

and shoulder regions, and by the tenderness of the arterial distribution. In occipital neuralgia, pain and tenderness are limited to the distribution of the occipital nerve.

When pain subsides after periarterial infiltration, it does so immediately. The duration of relief is unpredictable. It may fail or last for hours, days, or months. So many patients obtain prolonged relief that the procedure appears to be of definite value in pain control.

#### TRIGGER POINTS

Recently the tendency has been to deviate from the original criteria which have defined a trigger zone. Poking, pinching, and needling have been employed to ferret out trigger zones which affect the musculoskeletal structures. If these stimuli cause radiating pain similar to that of which the patient complains, and local anesthesia causes a temporary cessation of pain, some observers conclude that a trigger point has been located. In some reports multiple trigger zones are located in a single pain syndrome.

This line of reasoning has many pitfalls. In nearly all painful and tender syndromes, areas of tenderness are present which are much more acute than others. Pressure or needling in these areas often causes radiating pain and local anesthesia causes a temporary cessation of pain. Often these areas are not the etiologic bases for the painful symptoms, and, in conditions with hyperalgesia and hyperesthesia, erroneous conclusions may be reached by not taking all facts into account. We wish in no sense to detract from the fact that trigger zones do exist, but believe that they do not occur as frequently as would be expected from reports in the literature.

The fact that radiating pain develops on stimulation, and relief of pain follows anesthesia, is not sufficient to qualify the area to be a true trigger zone. Multiple trigger zones in a single condition often indicate a hypersensitive state. The more areas found, the less likely that a correct diagnosis has been made. Also, in hypersensitive patients with emotional disturbances and vague complaints which have uncertain anatomic patterns, the psychic effect of anesthesia at the site of pain may not be, at times, accurately evaluated.

Evidence in the literature shows that anesthetizing an area distal to the origin of pain often stops the pain temporarily.

Relief of pain occurring when stimuli are interrupted distal to the lesion is difficult to explain. For want of a better term we have used the phrase "ascending analgesia," realizing, however, that it is not an accurate explanation of this phenomenon. It cannot be ascribed to the action of local anesthetics because the same results were obtained by surgical section of nerves distal to the lesion. Temporary relief may follow, apparently, merely by interrupting the pathway either by surgery or local anesthesia. This train of events is another factor which may produce false interpretation of a trigger zone. In some instances, this can be avoided by carefully demarcating the tender zones which are associated with the trigger point. When somatic nerves become irritated, tenderness spreads from the point of irritation to the periphery. It does not travel proximally to reach the spine, nor are other segments or nerves involved. If tenderness spreads proximally, we may suspect that the sympathetic nerves have become involved. Clinically the somatic nerves would present a recognizable pattern of tenderness, while the sympathetic nerves would not. The latter would present a spotty or diffuse area of tenderness not conforming to somatic nerve distribution. Now what bearing does this have upon deciding whether or not a true trigger point is present?

In brachial plexus pain, due to a herniated cervical disk, multiple points can be located in areas distal to the cervical spine which are acutely tender and, when stimulated, cause radiating pain. Temporary alleviation of pain is frequently produced by local anesthesia of these areas. They are found in the tissues overlying the scapula, the superior medial aspect of the scapula, the infraspinatus fossa, the anterior scalene muscle, the medial aspect of the shoulder joint, and even the forearm. A patient may have 3 or 4 trigger zones. However, if we examine patients with this clinical picture, looking for tenderness closer to the midline, most of them have sharply tender areas on pressure and percussion over the cervical spinous processes at levels corresponding to the lateral painful areas in spite of the fact that these midline areas are not spontaneously painful. This tenderness may be more acute than in the painful area. If these findings are present, as they usually are, the lateral painful area should not be considered a true trigger point, but rather an area of referred pain and tenderness until proved otherwise.

In this series of brachial plexus pain, the pain associated with these apparent trigger points disappeared almost instantly when heavy headhalter traction was applied. The fact that tenderness is found in the vertebral region at the same level of the painful area makes it more probable that the pain origin is spinal and not in the lateral soft tissues.

If a painful, tender area is isolated with no tenderness in the proximal or distal areas, and the criteria of a trigger point are present, we are more apt to be right in assuming that this area may be the origin of the pain.

#### INTERSCAPULAR PAIN

Pain in the interscapular region is, at times, difficult to localize and control. This area is a favorite to search for trigger points, especially along the inner border of the scapula, and in tissues made accessible by lateral shift of the scapula. Heat, cold, nerve blocks, infiltration of so-called trigger points and postural correction frequently fail to produce satisfactory relief of pain. Negative studies and absence of objective findings frequently pose a problem.

Since pain at these levels can be caused by several conditions, it is worth while to differentiate a number of conditions, which, because of atypical symptoms, may cause confusion. Pain in the interscapular region may be produced by several common conditions: (1) herniated cervical disk, (2) cervical rib and scalenus anticus syndrome, (3) intercostal neuralgia, (4) local disease, (5) atypical pain from coronary disease, and (6) visceral referred pain.

Herniated cervical disk. The most intense pain may be in the interscapular region with only minor, negligible, or no pain in the arm. If positive cervical traction and compression maneuvers are present, they are almost pathognomonic of this condition. In addition, tenderness over the lower cervical spinous processes on pressure and percussion, and radiating pain to the interscapular region of scalene compression by rotation and extension of the cervical spine are further confirmatory signs. Roentgen studies may or may not reveal narrowing of intervertebral spaces at levels which correspond to the clinical findings. Neurologic findings may be confirmatory.

Cervical rib and scalenus anticus syndrome. Pressure upon the lower end of the anterior scalene muscle causes intensification of pain not only in cervical rib and anterior scalene syndromes but also in herniated cervical disks and other conditions affecting the nerve roots at these levels. Roentgen studies eliminate or confirm a cervical rib. In a scalene syndrome, diagnostic compression and traction maneuvers are negative and the cervical spine moves freely. A diagnostic infiltration of procaine in a primary sca-

lene syndrome relieves pain completely within three minutes. Criteria for interpretation of this test have been previously described. In the presence of a cervical spine or shoulder girdle lesion associated with a reflex scalene contracture, only partial relief is obtained, and the primary cause of the pain must be sought. Most scalene syndromes are secondary.

Intercostal neuralgia. This condition is diagnosed by finding segmental tenderness of the sensory dermatomes which correspond to the painful interscapular levels. If tenderness is present over the spinous processes, it shifts with displacement of the skin. Paravertebral nerve block stops pain and tenderness in a few minutes, serving as a diagnostic as well as a therapeutic procedure.

Local disease. In local conditions affecting the interscapular region, tenderness is localized to the painful area only. Careful search is made for palpable tissue changes and roentgen studies should include the dorsal spine, scapula, and chest. Visceral referred pain is the condition most likely to be confused with local disease. Anesthesia of a painful area followed by relief of pain may be misleading. Metastatic malignancy, not immediately apparent in roentgenograms, may be revealed in repeated studies.

Atypical coronary pain. In some instances, pain having its origin from the heart has its greatest intensity in the interscapular region. Spot tenderness to pressure or pinch may or may not be present. Tenderness is usually absent. All attempts to reproduce the pain by movement of skeletal structures are negative. A history usually reveals that the pain is brought on by effort. Symptoms can be produced by exercise and relieved by nitroglycerin. Coronary pain may be difficult to diagnose because of completely negative electrocardiographic studies and atypical location of pain. In patients with atypical pain and negative studies, the history may provide the only clue.

Visceral referred pain. We have become aware of a group of patients complaining of interscapular pain with variable degrees of severity. The pain may remain localized to the interscapular region or radiate to the lateral and anterior chest wall, or less frequently to the epigastrium. The pain is often extremely severe, either preventing sleep or awakening the patient from sleep. Frequently the pain is in no way associated with visceral disturbances, and bears no relationship to food intake. An interesting feature is constant pain which, in some patients, is not affected by motion or change of position.



Fig. 3. Elicitation of tenderness over spinous processes. Patient is seated with arms wrapped tightly about the chest and the spine flexed with chin on chest. A hard rubber hammer is used to percuss midspinous line. Acute reactions of sensitivity are noted when D6, D7 levels are percussed with absence of tenderness above and below these levels.

In these patients, pain was due to lesions involving the upper gastrointestinal tract.

Our observations date back to 1942, when we were consulted by a patient who was referred for nerve block. The chief complaint was severe constant bilateral radiating pain for seven months. Pain was intense in the interscapular region. Tenderness was absent, nor did signs indicate that the pain was of musculoskeletal origin. Pain was not related to food intake, and symptoms did not suggest a visceral disturbance. The patient was hospitalized and studied. A deep ulcer of the duodenal cap was found. Pain subsided immediately with ulcer therapy.

The concept that local pain and reflex radiating pain without pattern tenderness are often indicative of a visceral rather than a musculoskeletal lesion, focused our attention upon visceral possibilities at these levels.

We observed later that, although no evidence of pattern tenderness could be found, in many cases, the spinous processes at D6 and D7 levels were tender to percussion (figure 3), so that we came to regard this finding as presumptive evidence of upper gastrointestinal lesions. This was

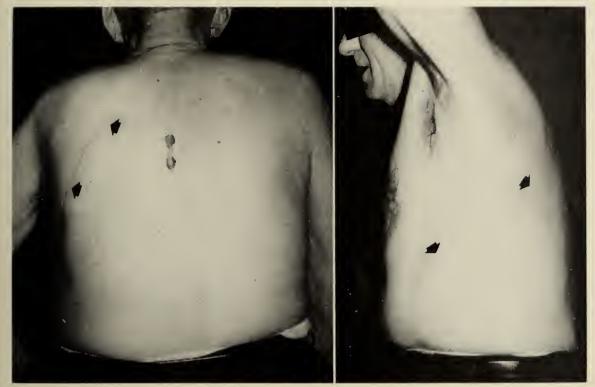


Fig. 4 (left). Fig. 5 (right). Patient with constant severe interscapular and chest-wall pain for three years. Onset was one month after lobectomy for pulmonary neoplasm. No gastrointestinal symptoms. Pain was relieved almost immediately with ulcer regime. Pain due to a duodenal ulcer overlapped the lobectomy scar. Patient has remained free of pain and has discontinued narcotics.

confirmed in a significant number of patients. In our first few patients, we failed to use percussion over this area.

In several patients without complaints in this area, D6 and D7 tenderness in itself prompted us to make inquiry concerning a possible visceral lesion. In one patient, an old ulcer history was uncovered and roentgen studies revealed a duodenal ulcer crater. In others, deformity, nodularity, and distortion of the mucosa were reported.

The tenderness over D6 and D7 spinous processes is in the skin. This can be demonstrated by pulling the skin beyond the midline and again percussing the spinous process. Tenderness disappears. If the skin is allowed to return to its position, tenderness is again present on percussion. Anesthetizing the skin with procaine also abolishes the tenderness.

We became increasingly aware that absence of gastrointestinal symptoms and negative roent-gen studies did not eliminate a lesion. This should have been evidence because of the asymptomatic patients who suffer gastrointestinal hemorrhages and exhibit no objective findings after thorough investigation. On the other hand, a

lesion may be impossible to diagnose prior to onset of hemorrhage or perforation unless a clue is present to create suspicion of a lesion.

A student who complained of interscapular pain presented no signs to suggest any form of musculoskeletal or visceral pain. The patient was informed that no signs of intercostal neuralgia were present but that a nerve block would be done to note the effect. We did, however, inquire whether or not upper gastrointestinal study had been done. Nerve block had no effect upon the pain. The patient was due back in a week but did not appear because of sudden hemorrhage due to duodenal ulcer.

Tenderness over D6 and D7 spinous processes is so frequent in these patients, that we have come to regard this finding as a sign of irritability of upper gastrointestinal tract. In a patient referred for nerve block, D6 and D7 spinous processes were tender to pressure and percussion. There was no evidence of pattern tenderness in the periphery. We advised an upper gastrointestinal study. He returned home and was studied, but no abnormalities were found. He collapsed from hemorrhage three months later and was told he had an occult ulcer.

Another patient suffered for four months with extremely severe *constant* pain which radiated from the interscapular region to the right chest. Various forms of therapy gave no relief. Because of local pain and tenderness, a portion of rib had been resected on the right side without relief. Little sleep was obtained during this period and the patient lost 25 lb. Symptoms did not suggest a visceral disturbance. Examination revealed tenderness over D6 and D7 spinous processes and a small area of spot tenderness in the right lateral chest wall. Roentgenograms revealed a moderate sized gastric ulcer crater. Relief of pain was immediate with ulcer therapy. Tenderness of D6 and D7 spinous processes persisted until serial studies showed complete healing, at which time the tenderness disappeared.

Another patient who complained of severc constant interscapular pain for two years had been taking physical therapy and bending exercises. Acute sensitivity to percussion over D6 and D7 spinous processes was the only surface manifestation. This patient proved to have a walled-off, perforated gastric ulcer. Pain was

relieved by a subtotal gastrectomy.

A patient who suffered severe constant interscapular and lateral chest pain was referred for an opinion (figures 4 and 5). A paravertebral nerve block had been administered elsewhere several days before, without relief. An upper gastrointestinal study was interpreted as negative. The only positive finding was acute tenderness over D6 and D7 spinous processes. Immediate relief was obtained by a Sippy diet and medication.

A patient returned to the office with severe interscapular pain two weeks after laminectomy for a cervical disk. Ordinarily this condition would have been attributed to postoperative pain, but examination revealed tenderness of D6 and D7 spinous processes. X-ray films revealed a small duodenal ulcer. Immediate relief was obtained by diet and medication.

A 65-year-old physician suffered with widespread radicular pain involving the left shoulder girdle, arm and chest, the middle and lower thoracic cage, low back, and left leg. Signs and symptoms suggested both a cervical and lumbar herniated disk, with positive neurologic findings as well as narrowed interspaces at the involved levels. In addition, evidence was noted of a possible old compression fracture in the lower dorsal spine. In the course of examination, tenderness was found over the lower cervical spine, the lower dorsal spine, and the lumbosacral junction, all of which could be explained on the basis of the above findings. Acute tenderness was also present over the spinous processes of D6 and D7. Below this, tenderness was not present until the lower dorsal spinous processes were stimulated. Roentgenograms revealed a duodenal ulcer.

Another patient was admitted to the hospital complaining of sudden weakness and tarry stools. Pronounced tenderness was present over D6 and D7 spinous processes. No gastrointestinal symptoms or pain had been experienced. Initial roentgen studies revealed no abnormal findings. Subsequent studies revealed an inconstant fleck suggesting an ulcer crater.

These are but a few of the cases we have observed with gastrointestinal lesions as the cause of severe interscapular pain. Most of these were

confirmed by roentgen studies.

What then should make us suspicious of visceral pain in this area? First, an examination and study to rule out pain possibly being referred from the cervical spine, such as a disk or other cervical spine lesion, osteoarthritis, cervical rib, or scalene syndrome. Intercostal neuralgia, local lesions, atypical heart pain, or a chest lesion should be excluded.

The most constant sign we have observed has been tenderness to pressure and percussion over D6 and D7 spinous processes. This may be associated with areas of spot tenderness in the periphery of these levels. Often it is not. In some patients, no areas of tenderness can be found. We cannot depend upon the fact that no gastro-intestinal symptoms are present or that pain is not related to food intake. Pain is often constant and may become severe during the night. Roentgenograms do not always reveal the presence of a lesion. In some patients who presented the above signs, and who had negative studies, diet and medication caused cessation of symptoms.

On the initial visit, each of our patients was given 2 or 3 tablets of acid adsorbant. Dramatic relief of constant severe pain was obtained with-

in ten to twenty minutes by 5 patients.

Obviously, since almost all of our patients were referred for roentgen studies because of tenderness over D6 and D7 spinous processes, the roentgen abnormalities noted in association with midline tenderness were of extremely high incidence, so that these figures are misleading. Approximately 30 per cent of the roentgen studies, however, were negative. In the negative group, 1 patient had a hemorrhage and several obtained prompt relief of symptoms with ulcer diet and medication. In the group with

negative roentgen studies were patients with no complaints referable to the levels studied who were studied only because of tenderness over D6 and D7 spinous processes. The true incidence of this sign can be determined only by a large series of patients with known pathology. Many upper gastrointestinal lesions have come to light since we have employed this technic, and we feel it is a sign which merits attention.

In this series, 40 patients were observed. Abnormal findings were reported in 32. Active ulcers were diagnosed in 13, 3 had gastric ulcers, and 10 duodenal ulcers. Distortion of the duodenal cap or duodenitis were reported in others. Nearly all of the patients in this series obtained relief of pain on an ulcer regime. Reports were negative in 8 patients. Of these, 1 developed an upper gastrointestinal hemorrhage three months after the negative report.

#### SUMMARY

Reasons have been presented for failure to obtain relief of symptoms concerning painful conditions which affect the shoulder girdle and upper extremity. Radiating pain, with its greatest intensity expressed in areas far from the actual source of irritation, multiple overlapping pain syndromes, and visceral referred pain simulating somatic pain are among the main causes of confusion.

A clinical concept is offered which has been found to be of value in the interpretation of the subjective and objective manifestations of somatic pain. Differential examination of the neck, shoulder girdle, upper extremity, and interscapular region is reviewed from the clinical aspect with special emphasis upon syndromes resulting from mechanical lesions of the cervical spine. Complicating factors of painful cervical spine lesions, such as vascular headache, scalenus anticus syndrome, and dystrophic changes in the peripheral tissues are discussed from the viewpoint of diagnosis and therapy. Possibilities of

erroneous conclusious in the interpretation of trigger point criteria are mentioned.

The concept that mild constant traction is necessary to overcome muscle spasm and pain in the cervical spine is criticized. Nearly all of the so-called intractable patients with brachial plexus pain due to mechanical pressure lesions obtained relief of symptoms with heavy traction. Included was a group who had undergone constant conventional traction without relief.

Occipital pain and headache, a common complication of painful cervical spine lesions, is discussed in detail. The symptoms and signs suggest that in most cases the pain is vascular in origin. Occipital periarterial infiltration with procaine causes pain to subside rapidly in many instances.

Scalenus anticus syndrome is discussed in detail, especially criteria for interpretation of symptoms and signs as they relate to therapy. A simple hypodermic needle technic is described for injecting the scalenus anticus muscle as a diagnostic and therapeutic procedure.

A new effective method of administering traction is presented. Test traction reveals that in the average intractable herniated disk more rapid relief is obtained when 25 or 45 lb. of traction are employed. Roentgen studies show that actual widening of intervertebral spaces takes place when over 25 lb. of pull is exerted.

Interscapular pain, often a problem because of difficulties in obtaining permanent relief in this area, is clinically differentiated. Several patients in this group failed to obtain relief after treatment for musculoskeletal pain and were referred to us for nerve block. In an unexpected number of patients, intractable pains in this area were due to lesions of the upper gastrointestinal tract, usually gastric or duodenal ulcers. In several patients, no symptoms were referable to the gastrointestinal tract. A new clinical sign is presented which, the authors feel, provides a clue to the presence of upper gastrointestinal lesions.

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### Editorial

All inquiries and manuscripts for the Section on Pain should be sent to Dr. John S. Lundy, 102 Second Avenue S.W., Rochester, Minnesota, or to the Editorial Department, The Journal-Lancet, 84 South Tenth Street, Minneapolis 3, Minnesota.

### ANALGESIA STRESSED AT ANNUAL SESSION OF AMERICAN MEDICAL ASSOCIATION

At the American Medical Association, held in San Francisco, June 21 to 25, 1954, many papers which dealt with the question of pain and distress were read. It seemed significant, furthermore, that on Friday morning, June 25, the Section on General Practice, the Section on Military Medicine, and the Section on Anesthesiology assembled for a joint meeting, designated a Symposium on Pain: Causative Mechanisms, Effects and Therapy. Papers presented were as follows: "A Critical Appraisal of Pain-Relieving Drugs," by Windsor C. Cutting of San Francisco; "The Use of Analgesics and Anesthetics for the Relief of Pain," by Edward B. Tuohy of Los Angeles; "The Role of Physical Medicine in the Relief of Certain Pain Mechanisms" by Allen S. Russek of New York; "The Pattern of Pain in the Diagnosis of Upper Abdominal Disorders," by Lu-

cian A. Smith of Rochester, Minnesota; and "Problems of Over-Treatment of Surgical Casualties with Depressant Drugs" by Harvey C. Slocum, Washington, D. C.

The symposium was well attended; it was interesting and the discussion was excellent. It was gratifying that the subject of pain was the object of so much concern at such a great national meeting. There is obviously a trend in the direction of increased attention to the alleviation of pain. As I suggested in an editorial for the Section on Pain in this journal for April 1954, the day of analgesia probably is not far away. The advent of that day could be hastened greatly, however, if still more interest in the subject could be aroused and if a stronger demand for results were forthcoming from physicians. Efforts toward arousing interest, and the demand for effective means of relieving pain should be directed at medical schools and pharmaceutical houses.

Again readers are requested to express to the editor or publisher of this journal, or to me, their thoughts about this Section on Pain. Should it be continued and, if so, what subjects should be covered? As for contributions to it, if to prepare an article is too much effort, perhaps an informed author could prepare an editorial on some subject dealing with pain. Either type of contribution that is submitted will receive every consideration.

JOHN S. LUNDY, M.D.

### Reviews of New Books

PAIN SYNDROMES AND THEIR TREATMENT WITH SPECIAL REFERENCE TO SHOULDER-ARM PAIN, by James M. Tarsy, M.D., chief, Arthritis Clinic, University (New York Postgraduate) Hospital, New York University-Bellevue Medical Center, 1953. Springfield, Illinois: Charles C Thomas. 592 pages. Price \$12.00.

The author's reason for writing this book, which deals primarily with pain in the cervicothoracic and shoulder regions, plus peripheral pain in the upper extremities and thorax, was "to help the average physician and surgeon in his diagnosis and treatment of shoulder-arm and other types of pain presented in the syndromes which follow,"

The book has been written in such detail that 19 pages are required for the listing of subjects in the table of contents. Under anatomic considerations the author discusses (1) anatomy of pain, (2) neuro-anatomic concepts, (3) special anatomic features of the neck, and (4) special anatomic features of the thorax. Pain in this particular part of the body occurs with great frequency. All the factors that are likely to be encountered in medical practice in respect to this type of pain are presented in detail from the standpoints of diagnosis, treatment, and certain other phases, including the use of local anesthetic agents as well as thoracic nerve block.

The various chapters are well documented with references; the print is easy to read; and the paper is excellent. The book is adequately indexed. It fills a very special need for the specialist and general practitioner.

[OHN S. LUNDY, M.D.

REGIONAL BLOCK: A HANDBOOK FOR USE IN THE CLINICAL PRACTICE OF MEDICINE AND SURGERY, by Daniel C. Moore, M.D., director, department of anesthesiology, Mason Clinic; chief of anesthesia, Virginia Mason Hospital, Seattle, Washington, 1953. Springfield, Illinois: Charles C Thomas. 373 pages. Price \$11.00.

This book is intended to present to the general practitioner and to the specialist, particularly the man who plans to become an anesthesiologist, a concise outline of the various phases of regional analgesia. It is concerned with the commonly used forms of block procedures, and does not attempt to cover the entire field. No claim of originality is made for the procedures and methods described in the book. References have been omitted, because the text is designed to be a handbook — not a reference book. A chapter of general information is presented first, definitions of terms to be used are given, and some general information that needs to be known and followed is offered.

The chapter on local anesthetic drugs compares many of those which are frequently used and gives briefly the essential facts about each. Vasoconstrictor drugs also are described, toxicity of drugs is considered, and there is a chapter on hyaluronidase. Another chapter considers conditions that influence the use of regional methods. Comments are made on office practice and equipment.

The author's technics are described and the various forms of block procedures are described according to anatomic sequence, beginning with the scalp and proceeding caudad throughout the body. This arrangement makes it simple for anyone to find the section on block of a region without searching through the entire book.

A chapter covers the therapeutic use of alcohol. Spinal anesthesia is presented in detail—both the single dose and the continuous method, use of the needle method and use of the catheter method. Epidural anesthesia is described with both the needle and eatheter technics. Intratheeal use of vasoconstrictor agents is touched on.

The book is adequately indexed. The paper is of excellent quality, and there are 262 illustrations. This text-book is timely in its presentation of the use of many block procedures. For some reason not entirely clear, the beginner seems to have less and less opportunity to learn these technics, a situation which is regrettable.

JOHN'S. LUNDY, M.D.

# Current Literature on Pain

PAIN – CONTROLLED AND UNCONTROLLED. JAMES D. HARDY, HAROLD G. WOLFF, and HELEN GOODELL. Reply by HENRY K. BEECHER. Science 117: 164-167, 1953.

Emphasis has been placed on the study of pain as distinguished from the "pain experience." The "pain experience" is the individual's integration of all the effects of noxious stimulation and pain, including reaction to the fear of pain, reaction to the noxious stimulus, reaction to pain itself as conditioned by the individual's total past experience, as well as pure pain sensation.

The investigator is especially interested in the pure sensation of pain. Animal experimentation is inadequate. Man's subjective response must be used for the study and evaluation of pain. However, bedside testing, valuable in itself, is limited by the intrusion of other aspects of the "pain experience."

The measurement of pain threshold-raising action of analgesics is but a single aspect of the total problem. Placebos, by virtue of their suggestive effect, strikingly modify pain thresholds and may simulate the effective-

ness of an analgesic agent.

Strong objection must be raised concerning attempts to study pain by avoiding it. Studies directed at obtaining "objective data" about pain are nearly always attempts to avoid the *sine non qua* for pain studies, pain itself.

The reply to these observations is that the experimental methods studying "pure pain" are not consistently repeated with the same results. Doubt is raised that the pain sensation *has* been separated from associated pain patterns. These experimental methods of studying "the pure sensation of pain" do not differentiate between a large dose of morphine and a placebo. Doubt is thereby cast on their value.

Certainly the study of pain must be carried out with man as the subject. However, indirect methods of study are well accepted in the biologic sciences. The plan is to study and measure pain in terms of the relief of

pain with drugs.

Serious objection is raised to the use of highly trained subjects in evaluating the efficacy of analgesics. Analgesic drugs produce a number of subjective responses aside from pain relief: euphoria, giddiness, and so forth. Highly experienced subjects certainly cannot be unaware when such a drug is used. Such unconscious bias must be eliminated.

TRICHLORETHYLENE IN LABOUR. E. E. RAWLINGS, M.D. Brit. M. J. 4807:436-438, 1953.

A portable inhaler delivering a concentration of 0.45 per cent trichlorethylene in air was used for obstetric analgesia in 400 cases. Adequate analgesia was obtained in 290 cases. Administration was not begun until the cervix was dilated three finger-breadths, since uterine inertia may result if the drug is given too early in labor.

No maternal deaths occurred, and no increase in necessity for operative delivery or in postpartum hemorrhage was encountered. Incidence of fctal asphyxia is not raised by this drug. Administration should be stopped if labor is not completed by the end of six hours, or if strength and frequency of uterine contraction are diminished.

PEPTIC ULCER: THE EFFECT OF ANTICHOLI-NERGIC DRUGS ON THE MECHANISM OF PAIN. Walter L. Palmer, M.D., Firmin Vansteenhuyse, M.D., and Joseph B. Kirsner, M.D. Am. J. M. Sc. 224:603, 1952.

Anticholinergic drugs such as Banthine and Prantal do not directly alter the mechanism of pain in peptic ulcer. The relief of pain observed clinically is probably due to an indirect effect resulting in decreased exposure of the ulcer to the acid attack.

In patients with active sensitive peptic ulcer, pain can be induced by injection into the stomach of dilute solutions of hydrochloric acid. Acid gastric juice not only causes the ulcer and the inflammation but lowers the pain threshold in the nerve endings and is itself the usual stimulus for the pain. The ulcer is sensitive to both chemical and mechanical trauma while the intact

gastrie wall is not.

If ulcer pain were primarily due to a motor disturbance, spasm, hyperperistalsis, or lack of coordination of the peristaltic waves, anticholinergic drugs should not only relieve the pain but also desensitize the pain mechanism. It was found that this is not true, but Banthine and other anticholinergic drugs are believed to relieve pain by inhibiting or decreasing gastric peristalsis and thus gastric emptying is decreased. Therefore, the acid attack on the ulcer is decreased. The decreased sccretion of acid further lowers the acid attack. The results are a decrease in the inflammatory process, an clevation of the lowered pain threshold, and a decreased exposure of the nerve endings to the acid stimulus.

Mayo Clinic Dict Manual, by the Committee on Dietetics of the Mayo Clinic, second edition, 1954. Philadelphia and London: W. B. Saunders Co. 247 pages. \$5.50. In reviewing the second edition, I noted that the program for obstructing gastric and duodenal lesions contains an improved list of foods allowed. This is particularly true of the vegetables. The list of foods included in the gallbladder

diet are more plainly stated.

The rephrasing of "adequacy and general description" of Cardiorenal Vascular diseases' dietary program presents a clearer picture than the

first edition.

The diabetic diet description is more complete. It includes standard soft, full liquid, and clear liquid diabetic diets.

The hyperlipoidemia diet contains 25 gm. of fat in comparison to 50 gm. of fat in the first edition of the diet manual. The 600 calorie reduction diet has been omitted from this edition.

The amount of protein in the standard pregnancy diet has been increased from 85 gm. to 100 gm. A 1,000 to 3,000 calorie diet for anorexia has been included in this edition.

Complete hospital diets for children are described. A new section of calorie values of beverages and snack foods has been added. A chart of the revised 1953 National Research Council Recommended Daily Dietary allowance is included. These allowances have been used throughout the manual.

ANN CROWLEY

Aspects of the Psychology of the Tuberculous, by Gordon F. Der-Ner, Ph.D., 1953. New York City: Paul B. Hoeber, Inc. 119 pages. \$3.50.

This book is based on the testing of 32 patients in a tuberculosis sanatorium in New York. Derner concluded that there is no unique tuberculous personality. The most frequent emotions of the patients were fear, apprehension, and depression. He did not see signs of the overly optimistic reaction, such as the psychiatrist, Wittkower, previously recorded. Most of the people had one desire, and that was to get out of the hospital and return to active life.

The earliest symptom was a cough which often was ignored. Next came fatigue, chest pain, loss of weight,



blecding, sputum, night sweats, some fever, loss of appetite, shortness of breath, and irritability.

These people need special psychotherapy, and they need sometimes help in changing their life's goals. Some patients have to give up some of their ambitions.

Walter C. Alvarez, M.D.

The Founders of Neurology, edited by Webb Haymaker, M.D., 1953. Springfield, Illinois: Charles C Thomas. \$10.50.

This book is an outstanding contribution to the field of neurology. Eighty-four authors have contributed 133 biographic sketches of the foremost neurologists of the past century, including neuroanatomists, neurophysiologists, neuropathologists, clinical neurologists, and neurosurgeons. It is not simply a compilation of the vital statistics and major contributions of the various men but a well-organized, highly-readable story of the development of the field of neurology. The individual sketches provide intimate views of the men, their personalities, and philosophies and excellent portraits of each are included. Their relationships with others in neurology, their families, and friends as well as many of the humorous and tragic situations that befell them are recorded.

Adequate references to the bibliographic sources are presented, and there is a valuable introductory explanation of the curricula in medical schools and terms used to denote medical positions, academic rank, and degrees in France, Germany, and Great Britain which is exceedingly helpful and informative.

A. B. BAKER, M.D.

The Digestive Tract in Roentgenology, by Jacob Buckstein, M.D., 1953. Philadelphia: J. B. Lippincott Co., 2nd ed., 2 vols., 1745 pages, 1,534 illustrations. \$30.00. According to the author's preface, all roentgenographic diagnoses pre-

sented in this text have been validated by operation or autopsy with histologic confirmation, Material has been chosen for clarity of reproduction of original films and for usefulness clinically and roentgenographically. Technical procedures required for definitive demonstration of particular lesions and diseases are explained. Rare conditions are described, but emphasis is upon practicality for internist, surgeon, gastroenterologist, and radiologist. The exposition will be found instructive also for the general practitioner, especially because of the many illustrations accompanied by diagrams of normal anatomy and pictures of pathologic specimens which serve as reference and orientation. The author has accomplished his stated objectives.

The first volume discusses the hypopharynx, the esophagus, stomach and duodenum; the second volume considers the small intestine, the colon, the diaphragm, the gall bladder and bile ducts, the spleen, pancreas, and liver. Complete author and subject indices are given at the end of volume II. References to the pertinent literature are noted and listed for each chapter. Case reports are interpolated abundantly, a practice which greatly enhances the clinical value of the work.

The first studies of the alimentary tract were fluoroscopic observations of the esophagus and stomach after ingestion of bismuth, incorporated in several different media, by Cannon in 1896, Roux in 1897, and Rieder and Holzknecht in 1905. These early studies were largely of motility; neither the screen nor the plate was suffciently sensitive for detection of abnormalities or lesions. Now, with perfection of screen, compression-relief technic, Bucky diaphragm and adept use of the shutter, fluoroscopic screen, and radiogram are of about equal value for an experienced radiologist. Each method, fluoroscopy and radiology, complement the other, and the latter provides a permanent record which permits review by others than the original examiner. Complete knowledge of the normal appearance of all organs and of the usual unimportant aberrations is essential for accurate diagnosis.

The style of writing is that usual for medical literature, that is to say, indistinctive, plodding, and common, with frequent stereotyped jar-

(Continued on page 284)

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BOOK REVIEWS-

(Continued from page 282)

gon and occasional annoving redundancy and repetition. The descriptive legends accompanying the pictures are usually succinct and informative.

Exposition of the subject of hiatus hernia is incomplete and confusing. From the text, the assumption may be made that a short esophagus, with a small part of the stomach above the diaphragm, is a congenital anomaly, although the illustrations 110A and B, 111A, B, C and D, and 112 are all adults and show the effects of chronic constrictive and contractive esophagitis. The matter is not clarified in the section on Herniation of the Diaphragm in volume II.

The approach to the roentgenographic diagnosis of gastritis is properly cautious. When writing of pylorospasm or antral gastritis something should be said about prolapse of the gastrie mucosa through the pylorus into the duodenum. Instead the subjeet of prolapsed mucosa is grouped with benign tumors of the stomach, particularly pedunculated polyps, an arrangement which disorders the usual classification of the condition. .

The discussion of gastric polyps is, on the whole, not quite satisfactory. The problem of giant gastric rugae, hypertrophied folds, and tumor formation is not well resolved.

The sections dealing with malignant tumors of the stomach, gastric and duodenal uleers, syphilis and tuberenlosis of the stomach, and postoperative appearances and abnormalities provide adequate and satisfactory information of these subjects.

For examination of the small intestine the author prefers observation of ingested barium mixture instead of the intestinal enema by transduodenal intubation. The progress method requires more time and a greater number of films than the filling of the gut by tube, but more nearly simulates normal behavior. Both performances have disadvantages, the one from incomplete filling and the other from overlying loops of bowel. Use of saline, or of eold solutions of barium is not mentioned.

The author subscribes to the idea that the appearance of the small bowel in sprue and similar conditions is due to excess of mueus and fat, and disordered innervation. A rare picture of Meckel's diverticu-

hum is clearly shown on page 595. The colon is observed by fluoroscope and later by films after a suspension of barium is introduced as an enema. When advisable air insufflation is done by the author after the enema has been evacuated. Apparently none of the modifications of the simple technic is used, and actually none is more satisfactory than the standard procedure.

Discussion of the significance of the filled appendix is properly conservative. The only diagnostic stress is upon the demonstration of appendiceal calculi.

The author considers the oral method for choleeystography sufficiently satisfactory, favoring Priodax, but mentioning Telepaque as yielding well defined, dense shadows, but often obscuring the gallbladder region by the excreted dye in the hepatic flexure of the colon. Films made in the erect, left oblique position are often helpful. Chapter 63 is devoted to cholangiography.

Volume II concludes by expounding the roentgen diagnosis of diseases and abnormalities of the spleen, liver, and pancreas.

James B. Carey, M.D.

# American College Health Association News . . .

The Fourth National Conference on Health in Colleges eoncluded its four-day meeting at the Hotel Statler in New York City on May 8. The conference was sponsored by the American College Health Association in cooperation with the National Tuberculosis Association; 44 other organizations interested in the health problems of college students were co-sponsors. Approximately 500 representatives of these and other organizations were registered.

Dr. J. L. Morrill, president of the University of Minnesota, was president of the conference; Dr. Dana L. Farnsworth, of the Massaehusetts Institute of Technology, was chairman of the Executive Committee; and Miss Charlotte Leach, of the National Tuberculosis Association served as secretary with Dr. Carl R. Wise, of Columbia University, as chairman of the Committee on Local Arrangements.

Sixteen committees were assigned to as many phases of problems on student health and met almost continuously during an intensive two-day period of the conference. Final summaries and reports were made by the chairmen on the last day of the meeting; these will be gathered into book form and issued in September or October as a handbook or text of present-day thinking on the theme of the conference — "Teamwork in Meeting the Health Needs of College Students.'

Each registrant at the conference will receive a copy of the book and one will be sent to each member college library. Other persons interested may obtain information concerning the volume by writing to the secretary of the conference (Miss Leach) or to the secretary of the A.C.H.A. Some of the papers read at the major combined meetings of the conference will be published in this Journal at a later date.

The Council of the A.C.H.A. held 2 short meetings during the conference. The first meeting on May 5 was devoted to routine approval of the actions of the officers and committee members during the year, approval of bills to be paid, and acceptance of new members to the association on the recommendation of the executive committee. At its second meeting on May 7, the council selected Minncapolis, Minnesota, as the location of the 1956 meeting. The University of Minnesota will be the host school. Approval was given for the dates of April 28, 29, 30 for the 1955 meeting at Colorado Springs, Colorado, with the Rocky Mountain Section as host.

The council also authorized the sending of one free copy of the College Health Survey report by Drs. Moore and Summerskill to each member institution library. The remaining eopies in the possession of the association are to be sold at \$1.00 per copy to anyone requesting one. It was also voted to subsidize the publication Student

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Medicine for the coming year to the extent of one free copy to each medical school in the United States, the subscription cost to be paid by the association.

A short business meeting of the entire association was held at the luncheon on Friday preceding the address by Dr. Howard Rusk. The following officers were elected for next year: president, Norman S. Moore, M.D., Cornell University, Ithaca, N. Y.; president-elect, John W. Brown, M.D., University of Wisconsin, Madison, Wis.; vice-president, Muriel Farr, R.N., Bryn Mawr College, Bryn Mawr, Pa.; secretary-treasurer, Irvin W. Sander, M.D., Wayne University, Detroit. Members at large: 3-year term — Donald S. MacKinnon, M.D., University of California, Los Angeles; Bruce Roxby, M.D., Temple University, Philadelphia. 2-year term — Carl Wise, M.D., Columbia University, New York City.

Dr. John E. Sawhill moved that the thanks of the association be extended to Dr. Edith M. Lindsay for the five years of faithful, devoted, and extremely capable services rendered as secretary-treasurer of this association.

The seventeenth annual meeting of the Michigan College Health Association was held at McKenney Hall, Michigan State Normal College, in Ypsilanti, Michigan, on Friday, May 21. Presiding was Dr. Irvin W. Sander, of Wayne University, president of the M.C.H.A.

Dr. Warren Forsythe, of the University of Michigan, gave a report and summary of the Fourth National Conference on Health in Colleges, and Dr. Gordan Brown, of the University of Michigan School of Public Health, discussed the various aspects of the program of Immunization against Poliomyelitis.

At the luncheon meeting, Mr. W. J. Brownrigg, director of testing at Michigan State Normal College, discussed experiences with students carrying heavy outside work loads in relation to scholarship and drop-outs.

The afternoon program was a Mental Hygiene panel with Mr. Vernon Keye of Wayne University as chairman. Other members were Dr. S. C. Mason, director of outpatient elinic, Ypsilanti State Hospital; Miss Barbara Boger, mental hygienist at Michigan State College, East Lansing; and Mr. Lloyd Berridge, mental hygiene eounsellor at the University of Michigan. Mental hygiene problems relating to types of counselling were discussed.

At the business session, the following officers were elected for the next year: President, Dr. Olga Sirola, Michigan State Normal College; vice-president, Miss Barbara Boger, Michigan State College; secretary-treasmer, Mrs. Frances Kelly, Jackson Junior College.

The meeting adjourned to the dedication ceremonics of the Glenadine Snow Memorial Health Service Building. Dr. Snow was a charter member of the M.C.H.A. and served as director of the health service at Michigan State Normal College for over twenty-five years prior to her death in 1952. Miss Ruth Boughner, emeritus professor of physical education, gave the dedication address. The Michigan College Health Association announced a contribution of \$50 to the Glenadine Snow Memorial Fund for needy students, in the name of the American and Michigan College Health Associations. Dr. Eugene Elliot, president, accepted the building and fund for the college.

. . . .

The annual meeting of the South Central Section of A.C.II.A. was held at the University of Missouri, Columbia, on April 17. Dr. Ralph I. Canuteson, president, presided.

The minutes of the 1953 meeting were read and approved. The treasurer's report was read and accepted.

The nominating committee, William E. Taylor, chairman, Dr. Gross and Dr. Evans submitted a report and the secretary was instructed to cast an unanimous ballot for the following list of officers for the coming year, April 1954 to April 1955.

President, George X. Trimble, M.D., University of Missouri; vice-president, S. I. Fuenning, M.D., University of Nebraska; secretary-treasurer, Alta V. Bergquist,

R.N., Nebraska State Teachers College.

Directors for 2-year period: B. W. Lafene, M.D., Kansas State College; E. E. Feind, M.D., Missouri School of Mines.

Copies of the entire program of the 1953 meeting were made available to all members. Dr. Canuteson stated that this service was complimentary from the University of Kansas. A vote of thanks was extended to Dr. Trimble, University of Missouri, and to Dr. Cope, Stephens College, for courtesies extended to the organization and for the fine program provided.

# News Briefs . . .

# North Dakota

A CLINICAL laboratory occupying the lower floor of the Fargo Clinie was recently completed. Modern and complete, it is actually composed of several laboratories, which consist of the histology, hematology, chemistry, and bacteriological departments. Also included is a preparation department in which all glassware is sterilized. A gastrie room is maintained for the purpose of gastric analyses. The laboratory is used by the Fargo Clinie and St. Luke's Hospital.

. . .

A NEW CLINIC, representing an investment of more than \$100,000, has been opened at Crosby. The Kiwanis Club

recently gave a testimonial dinner in honor of physicians and dentists in the town who founded the clinic. A gift of \$300 was presented to be used toward equipment.

THE LEIGH CLINIC of East Grand Forks will be opened in the near future by Dr. James Leigh. The new clinic includes a waiting room, two examining rooms, office, laboratory, and storage room. Dr. Leigh has been associated with his father and brother at the Leigh Clinic in Grand Forks for the past year. For the present, Dr. Leigh will spend mornings at the clinic in Grand Forks and afternoons in East Grand Forks.

General Hospital at Devils Lake was recently purchased by the Evangelical Lutheran Good Samaritan Society of Arthur. Now known as the Good Samaritan Convalescent Home, it is operated for convalescents, bedridden patients, and aged persons.

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A JOINT COMMITTEE of hospital and medical association members was advocated at the annual convention of the North Dakota Hospital Association. Lyle A. Limond, executive secretary of the North Dakota State Medical Association, suggested such a committee be formed to discuss mutual problems and in that way better serve the interests of the public.

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The sophomore class of the University of North Dakota School of Medicine has completed the second year of its program of clinical clerkships. Students in groups of from 4 to 6 are assigned to physicians in various medical centers in the state for the month of May. Valuable experience is gained from working with patients, so that in their third year they are equipped to go into wards of teaching hospitals already familiar with the basic technics.

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DR. P. H. WOUTAT was elected president of the North Dakota State Medical Association at the annual meeting held early in May at Grand Forks. Other officers are: president-elect, Dr. D. J. Halliday; first vice president, Dr. R. H. Waldschmidt; and seeond vice president, Dr. R. W. Rodgers. Re-elected were: Dr. G. A. Dodds, speaker of the house; Dr. Ralph Leigh, vice speaker; E. H. Boerth, secretary; and Dr. E. J. Larson, treasurer.

Dr. Marlin J. E. Johnson, who joined the Quain and Ramstad Clinic in Bismarck in 1951, has been appointed to membership on the American Board of Internal Medicine. To become eligible for membership, physicians must take specialized training beyond internship and pass written and oral examinations.

# Minnesota

PLANS for a muscular dystrophy clinic at the University of Minnesota hospitals are nearing completion. The clinic will be outpatient in operation and supported by the Muscular Dystrophy Association of America. The Twin Citics chapter will help in obtaining transportation for disabled persons.

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A CHILDREN'S HOSPITAL for Minneapolis is the goal of 55 of the city's pediatricians. They believe that a hospital emphasizing care of adults cannot supply the special instruments, laboratories, and trained personnel necessary for the care of children. If plans materialize, the hospital will be a teaching center. Cooperation of the University of Minnesota has been assured. In addition to pediatricians, the hospital would be open to general practitioners and specialists in fields other than pediatrics.

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Dr. H. S. Dieill, dean of the medical sciences at the University of Minnesota, was selected as one of three delegates to the annual assembly of the World Health Organization which was held in Geneva, Switzerland, May 4 through 22.

(Continued on page 290)

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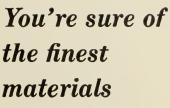
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NEWS BRIEFS-

(Continued from page 288)

Dr. Gilbert S. Campbell, of the department of surgery at the University of Minnesota, has been awarded the John Horsely Memorial Prize in the amount of \$600 by the University of Virginia. Dr. Campbell also recently received a \$30,000 Markle Scholarship.

. . . .

Dr. A. B. Baker, professor and director of the division of neurology, University of Minnesota, has been named chairman of the National Committee for Research in Neurological Disorders. The purpose of the committee is to stimulate research and training in the field of neurologic disorders on a national level.

Dr. Annold J. Kremen, director of surgical research at Mount Sinai Hospital, Minneapolis, has been appointed chief of surgical service in the Francis Delafield Cancer Hospital and professor of surgery at Columbia University, New York City. Dr. Kremen will also serve as attending surgeon at the Presbyterian Hospital, New York City.

DR. E. A. BOYDEN, head of the anatomy department at the University of Minnesota, was honored recently at a dinner at the Campus Club. Dr. Boyden retired in June after twenty-three years as a professor at the university. In September, Dr. Boyden will continue his teaching and research as a visiting professor of anatomy at the University of Washington Medical School.

Dr. Roy G. Holly, associate professor of obstetrics and gynecology at the University of Minnesota, leaves September 1 to become professor of obstetrics and gynecology at the University of Nebraska Medical School, Omaha.

Dr. Peter Ward, medical director of Miller Hospital and Wilder Dispensary, St. Paul, since 1930, has resigned. After a vacation, Dr. Ward will locate in New York City.

Dr. H. N. Sutherland recently attended a testimonial banquet given in his honor by members of the Shipman Hospital staff at Ely. Dr. Sutherland is Ely's oldest physician, having practiced in the area forty-one years.

Dr. Arnold Robbins, a specialist in surgery, has joined Dr. Richard Nicholson in practice in Heron Lake. Previously, both men were associated in practice in Alaska. Dr. Robbins recently received his discharge from the Army Medical Corps. The surgical opening in Heron Lake has been kept open several months in anticipation of his arrival.

Dn. E. Duane Sommerness has been named the new clinical director of Fergus Falls Hospital. Previously Dr. Sommerness was located at Willmar. He replaces Dr. John Freeman who resigned to become clinical director of Jamestown Hospital at Jamestown, North Dakota.

(Continued on page 292)



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(Continued from page 290)

# South Dakota

The first organized meeting of clinic managers throughout the state was held recently in Mitchell. The group planned to meet twice annually to consider medical, legal, financial, insurance and organizational problems.

A JOINT COMMITTEE of the South Dakota Medical Association and the American Legion met in Huron a short time ago. Purpose of the meeting was to clarify differences between the groups concerning medical care of sick and needy non-service connected disabilities of veterans. Plans for two separate surveys were outlined, one to be made by each group.

DR. DONN R. DRIVER, chief of the medical service at the Veterans Administration Center, Sioux Falls, has been elected to membership in the American College of Physi-

Dr. A. W. Spiry was elected president of the South Dakota Medical Association at the annual convention held in Huron. Other officers are: Dr. F. D. Gillis, Sr., president-elect; Dr. A. P. Peeke, vice president; and Dr. G. I. W. Cottam, secretary.

Dr. F. T. Younker, formerly of Sisseton, has established a medical practice at Parker. The community has been without a physician for about a year.

0 0 0 Dr. Wendell W. White, a physician at Faith for the past four years, has established a practice at McLaughlin. Dr. White will be associated with Dr. G. C. Torkildson.

Dr. Donald F. Campbell, formerly of Watertown, began practice in Philip July 1. Philip and Haakon County have been without the services of a physician for approximately two years.

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\*Steigmann, F., and Goldberg, E., J. Lab. & Clin. Med. 42:955 (1953).

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### PARKINSONISM—

(Continued from page 246)

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-Sir William Osler.

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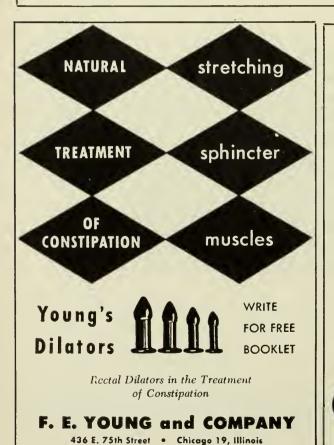
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# Journal Lancet

SERVING THE MEDICAL PROFESSION OF MINNESOTA, NORTH DAKOTA, SOUTH DAKOTA AND MONTANA

# Some Points in the Physical Examination of the Heart\*

S. MARX WHITE, M.D., F.A.C.P.

Minneapolis, Minnesota

No attempt is made here to cover the field of cardiovascular diagnosis. A few points are presented which have been found to be missed most often by those who do not concentrate on cardiovascular study to the exclusion of other interests. The roentgen ray, the electrocardiograph, and angiography have extended our field of observation so greatly that we readily neglect information to be obtained by less highly technical means. Data of crucial and inestimable value can be obtained without these procedures. In fact, there is a great deal these special methods cannot see, hear, or feel. The general practitioner, to be true to his cause, must be studious and as well informed in this field of medicine as in the more immediate objective realms of surgery.

Discussion of the diagnosis of diseases of the heart might well begin with an aphorism "The farther away from the heart one begins the study, the more complete and accurate will be the diagnosis." If the study begins at the heart region, it is easy to consider the information complete and to neglect more distant data.

Knowledge of the environment may make an important and crucial contribution, particularly in that great group of disorders with a functional component. Psychosomatic factors, for

s. MARX WHITE, an 1897 graduate of Northwestern University Medical School, is professor emeritus of medicine at the University of Minnesota. instance, may contribute to the development of essential hypertension and to disturbances of rate and rhythm, as well as to the so-called neurocirculatory disturbances.

While we now recognize that fat metabolism varies greatly in different individuals, a good cook in the family may be responsible for the initiation and persistence of obesity. Atherosclerotic changes in the vessels are associated with fat deposits under the skin and the consequences for the coronary vessels have come into the foreground of our knowledge.

I do not intend to belabor the importance of the clinical history, but circumstances do exist under which such information may reveal more than the physical examination. Long experience and intimate knowledge of cardiovascular function are necessary to obtain the greatest value from the historic background.

A few brief references suffice to illustrate: circumstances under which chest pain or dyspnea develop may reveal more than laboratory or clinical tests. Episodes of past cardiac decompensation become very important when operation and anesthesia are considered. I recently learned this the hard way when a patient required operation. Physical conditions, satisfactory electrocardiographic readings, and good cardiac function at the time spelled caution, but

<sup>&</sup>lt;sup>o</sup>Presented at the Continuation Course in Cardiovascular Diseases for General Physicians at the Continuation Center, University of Minnesota, March 22, 1954.

did not seem to call for denial of the procedure. I feel sure now that I did not give sufficient consideration to some minor episodes of decompensation more than a year before, but the result was a sudden "unexpected death" a few hours after anesthesia and a relatively minor operation.

Information regarding blood pressure needs appraisal. A difficulty here lies in the tendency on the part of some of us to be secretive and sometimes falsify, possibly for control purposes, when reporting to our patients. Knowledge of hypertension many years before may help to explain cardiac hypertrophy when the hypertension has subsided, as occasionally happens, without apparent cause or after myocardial infarction. Also, a careful history may reveal the characteristic episodes of hypertension with pheochromatosis or suggest investigation for stone or other form of localized kidney involvement.

Before proceeding to the intricacies of the subject, lct us consider briefly one more point. The first diagnosis of coronary thrombosis in this country was made by George Dock in 1896, two decades before the establishment of criteria of wide clinical usefulness by James B. Herrick. Dock made this diagnosis because of his intimate knowledge of gross pathology combined with his studies in clinical medicine. The physician who does not follow his patients to the autopsy table at every opportunity fails in his duty to his living patients.

I quote from a recent letter from Dr. Samuel A. Levine. "I feel strongly that seeing an autopsy of a patient that a physician has examined during life is one of the most instructive experiences he can have during his medical career. In fact, this is almost as true if the physician observes the postmortem findings of a patient whom he has not examined previously. One of the greatest handicaps that general practitioners and many internists have is that they rarely, if ever, obtain autopsies on their patients. This is a great pity, because they could learn so much from such a study."

In the physical examination, a study of the skin may reveal much, such as cyanosis and whether distribution covers the face, extremities, one or both, localized venous distension as over shoulders or in legs and hips and over abdomen.

There may be dilated and tortuous arteries over supraclavicular areas and upper back, as in coarctation of the aorta in the adult. In this condition also, pulsation may not be felt where it should be, as in the femoral vessels, popliteals, and the feet. Coarctation of the aorta should not be missed as a cause of arterial hyperten-

sion in adults. Some time ago I was making rounds with a studious young resident in a Kansas City Hospital. The case presented was that of a 19-year-old male with extreme arterial hypertension and the question was one of ctiology. My first move demonstrated the lack of femoral pulses. The embarrassment of the resident could have been lessened by a more adroit approach, but he never forgot the lesson. Tortuous collateral vessels over the shoulder and upper back, systolic murmur over the base of the heart region, and notching of the ribs in an x-ray film all contributed to reveal the cause of the hypertension. The new methods of arteriocardiography now lead the pediatrician to recognize this condition in infancy. Surgical cure at that time of life may conceivably eradicate this condition as a clinical problem, just as the early cure of syphilis has reduced incidence of syphilitic aneurysms to the vanishing point.

Records of the presence or absence of the pulses in the usual sites in the extremities may be of extreme value when the question of embolism in an extremity arises. The dorsalis pedis and the radial artery are often anomalous in distribution and may not be normally palpable. If, however, normal pulsation is noted in each such vessel, disappearance together with sudden pain, color change, slight swelling, and other criteria may establish embolism without an arteriogram.

The study of venous pressure is of great value in heart failure and in following the restoration of cardiac compensation as when digitalis exerts a favorable effect. Very satisfactory readings of venous pressure may be made at the elbow without resorting to the needle and manometer in individuals with good sized veins in this region. By freeing the arm, preferably the right, from all external pressures and raising and lowering the elbow under good lateral illumination, a level is discerned at which the previously distended vein collapses. At this level atmospheric and venous pressures are equal. Frequently the vein at this level pulsates and often becomes a little distended during exhalation and collapses and even pulsates during inhalation. Measure the difference between this level and that of the level of the middle of the right auricle, as previously marked on the chest wall of the recumbent patient, and a very satisfactory reading of venous pressure is obtained.

Some of the congenital anomalies and mitral stenosis have been subject to surgical intervention. Aortic stenosis and insufficiency have not, although the possibility of plastic substitutes has not as yet been abandoned. Study of some of the finer points in disorders at this valve help greatly in appraising the pathologic physiology.

With syphilis involving the aortic valve and aorta, there may be a loud systolic murmur over the aortic area and even, at times, a thrill, usually softer than with stenosis. These phenomena are due largely to turbulence set up when a certain critical velocity of the blood is exceeded in the large stroke volume ejected. As you know, there is no stenosis at the valve and the aorta may be ectatic. Characteristic, however, is the protodiastolic murmur which is heard over the entire precordium and in some instances transmitted to the left along about the fourth rib.

Aortic stenosis is one of the valvular lesions most often missed. Stenosis at the aortic valve is due principally, if not exclusively, to a healed rheumatic process and most frequently the mitral valve as well is more or less involved.

When the stenosis is great enough to delay ejection, prolongation of the systolic murmur may be noted. The hypertrophic left ventricle causes this murmur to be loud and rough, and all have, no doubt, heard the deep rough growl audible in some cases at some distance from the patient. The stethoscope should be used to hear the systolic murmur over the carotids, along the subclavians, and over the shoulders and upper back. Failure to do this is a principal reason why diagnosis is often missed. The systolic thrill is felt in less than 20 per cent of cases.

Listening for the regurgitant protodiastolic murmur establishes whether the lesion is at the aortic valve. In this condition the murmur is widely heard only when the element of insufficiency is great. As a rule, the regurgitant murmur is heard over only a small area to the left of the sternum at about the level of the fourth or fifth cartilage. With this murmur, and sometimes without, regurgitation can be established by listening for the Duroziez phenomenon at the femoral artery. Regurgitation may be fairly well established and no murmur heard when the formation of the calcified valve directs the regurgitant stream and turbulence away from the ventral aspect of the ehest.

In proportion, as the stenosis predominates over the insufficiency, the "pistol shot" tone over the peripheral vessels and the celerity of the pulse wave is cut down. Finally, with extreme narrowing, the characteristic pulsus tardus and occasionally pulsus bisferiens may be recognized. Accompanying mitral stenosis or high grade mitral insufficiency may so lessen the stroke output that all the pulse phenomena may

be more nearly those of the mitral lesion than of the aortic. Likewise, myocardial and coronary inadequacy can diminish the vigor of the anscultation and pulse phenomena so that the tardiness of the pulse wave of stenosis and the celerity of the pulse of insufficiency almost, if not entirely, disappear. By careful attention to these details, a very satisfactory impression of the progress of a case can be formed.

The changes in pulse amplitude and contour give the most valuable evidence, aside from the x-ray silhouettes, in differentiating aortic stenosis from the arteriosclerotic and hypertensive changes which occur in the aortic valve and the ectatic aorta.

Rupture of the inner coat of the aorta is another frequent source of missed diagnosis, and most often is called coronary occlusion (thrombosis). Rupture of the aorta can be recognized only by study of every available pulse and differential blood pressures of both arms and legs. Changes from day to day, even from hour to hour, are important in some instances. Shifting pain may give a clue: from retrosternal to shoulders to back, epigastrium and abdomen, rarely to one or both legs.

The symptoms suggesting acute coronary occlusion may be simulated by several other acute disturbances. Too often the diagnosis is made from these symptoms. Extreme care is needed to avoid missing such conditions as acute pericarditis, spontaneous pneumothorax, pulmonary embolism, acute cor pulmonale, and even acute pneumonia. When symptoms predominate in the upper abdomen, differentiation may be necessary from acute pancreatitis, perforation of stomach or duodenum, or acute gallbladder disease. Acute pain of paraesophageal herniation of the stomach has caused confusion, and each of these conditions should be kept in mind before making the final diagnosis.

Study of pulsation of chest walls gives much valuable information. Position, size, and force of heart apical impulse as in the fifth, sixth, or seventh interspaces can give a very definite impression concerning the relative degrees of hypertrophy and dilatation and reveal conditions which an electrocardiogram does not disclose. In the third left interspace, increased pulsatile activity of the outflow tract of the right ventricle is often visible and palpable. This is informative along with the increase of the sound of pulmonic valve closure as an index of pulmonary artery hypertension and right heart hypertrophy.

The common failure to recognize adhesive pericarditis is due most often to neglect to look

for the characteristic retractions at the apex and the well-known Broadbent's sign. Pulsation can occasionally be felt in the intercostal spaces in pulmonary hypertension with pulmonic valve insufficiency.

Diffuse weak pulsation on the right side of the chest may be seen and felt in a condition which is rare but important to differentiate. Massive dilatation of the left atrium occurs especially in rheumatic hearts with mitral stenosis and insufficiency in which there has been extensive damage to the atrial wall. Weak, diffuse systolic pulsation is visible and palpable over the right anterior area of chest dullness, owing to regurgitation into the greatly dilated atrium through the incompetent mitral valve. In some instances, a systolic murmur may be heard here in addition to the murmur heard at the apex. Auricular fibrillation is always observed. With these signs there may be dysphagia and partial left recurrent nerve paralysis. Aching or stabbing pain in the right chest may occur, which may extend to the right scapular region and shoulder. Pulmonary hypertension is rare and exercise tolerance is remarkably good considering the extent of involvement. An explanation for this may be that the cavity is capable of absorbing a considerable added amount of blood without causing increased venous pressure, as this is usually late in appearance as arc signs of passive congestion.

The great importance of recognizing this condition lies in the ready confusion with pleural effusions, especially when the dilatation extends well into the right hemithorax. To aspirate blood from the left atrium rather than fluid from the pleural space would be a serious error.

The physician should learn to recognize, isolate, and manipulate the carotid sinuses in all patients, even the normal. If the sinus is massaged and the characteristic gradual slowing with gradual acceleration after release is observed, the normal pacemaker is in operation. The sinus should be isolated under the fingers rather than merely to exert pressure in that region of the neck. This may be difficult in some short necked, stocky people. Occasionally in long necked, slender people, the sinus has been mistaken for an enlarged, elongated lymph node. Skill in manipulation of the carotid sinuses becomes of inestimable value in the recognition and relief of some forms of tachyeardia.

With paroxysmal aurieular tachycardia, the usual rate is 140 to 240 in adults. An occasional patient is able to describe the abrupt onset and offset of the paroxysm, especially after the events

have been explained. Each paroxysm tends to be of a duration similar to other paroxysms in the same individual. When prolonged hours or even days, they may be scrious when very rapid, especially in a heart already damaged.

Massage of a carotid sinus has stopped the paroxysm in more than half the cases by increasing vagus tone. In some patients, ocular pressure, stooping over, vomiting, or the Valsalva or Müller maneuver may also slow the heart rate. Acetyl-beta-methylcholine subcutaneously may aid, as may Digoxin and Digilanid C given intravenously.

Paroxysmal auricular flutter is usually at a regular and unvarying rate of 120 to 240 unless the patient is digitalized. In such cases the rate may be much slower or irregular because of increased blocking of impulses from auricles to ventricles. The tachycardia is more likely to be persistent than with other auricular, nodal, or ventricular forms. Carotid sinus massage often slows and frequently halves the rate, but tachycardia is resumed when the pressure is released. The chief advantage of the maneuver in this form of tachycardia is to slow the ventricular rate while making an electrocardiogram so that the underlying auricular pattern is revealed.

Unlike other paroxysmal tachycardias, ventricular tachycardia is serious in significance since it occurs most frequently with acute coronary occlusion or other structural damage to the heart. Carotid sinus pressure or other methods of vagus stimulation are not effective. In the majority of eases, the aurieles and ventricles beat at different rates. Careful auscultation reveals that the first sound of an oceasional beat is louder than the others. Ordinarily the aurieular sounds are not heard, but when an auricular contraction occurs synchronously with a ventricular, the combination causes that sound to be louder than sounds which precede or follow.

With complete heart block (auriculoventrieular dissociation) with the usual very slow regular ventricular rate and with a good stethoscope and careful auscultation, often at regular intervals between the ventricular sounds, a much duller softer sound is heard due to the auricular contraction.

When the auricular sound and the first sound of a ventricular contraction occur together, the summation produces a sound louder than those usually heard. This variation in the intensity of the ventricular sounds thus becomes significant and may be diagnostic even though the auricular sounds may not be audible.

# Aseptic Meningitis and Coxsackie Viruses\*

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Wallgren in 1925 described a syndrome of fever, nonbacterial, predominantly signs of lymphocytic meningitis, and, at times, symptoms from the upper respiratory tract. The onset of the disease was acute; deaths were not observed; and recuperation was usually rapid and complete. Wallgren believed this syndrome represented a nosologic entity to which he applied

the term acute aseptic meningitis.

Wallgren's syndrome is now known to occur as a result of infection with any of a number of widely differing infectious agents, such as Leptospirae and the viruses of poliomyelitis, arthropodborne encephalitides, lymphocytic choriomeningitis, mumps, and herpes simplex. In the last five years, the Coxsackie viruses were tentatively added to the list. Finally, some recently described but still unclassified viruses, characterized by their cytopathogenic effect in tissue cultures and their nonpathogenicity to laboratory animals may have to be considered.

From studies by Malmgren (1941), Alm (1951), and Lundbäck (personal communication), and as yet unpublished observations in our laboratory, it appears that leptospiral meningitis is rare in Sweden, that the arthropod-borne encephalitides and lymphocytic choriomeningitis are not indigenous in the country, and that mumps and herpes viruses are of only minor importance as causes of acute aseptic meningitis.

Paralytic poliomyelitis appears in Sweden in annual epidemics, the average attack rate being in the neighborhood of 30 per 100,000 inhabitants. Obviously, then, a fair proportion of the patients displaying the syndrome described by Wallgren must be victims of nonparalytic poliomyelitis. On the other hand, for some epidemiologic reasons, the existence of additional etiologic agents appears probable. The discovery of the Coxsackie group of viruses seemed to offer a possible solution to the problem and it was decided to test this possibility. The purpose of

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this paper is to summarize some of the observations made over a four-year period concerning the problems of the etiology of ascptic meningitis.

The investigation was conducted along two separate lines. First, we studied the occurrence of Coxsackie viruses in hospitalized patients suffering from meningitis or meningcencephalitis as compared with patients with paralytic poliomyelitis or miscellaneous diseases not involving the central nervous system. We hoped that by this means a statistical evaluation of the clinical importance of the Coxsackie viruses would be possible. The other approach to the problem consisted of epidemiologic field studies of outbreaks of diseases of various types in which Coxsackie viruses were with more or less certainty etiologically incriminated. As a particular part of this project, household contacts of hospitalized patients were examined. These studies aimed at a more thorough knowledge of the variations in the clinical manifestations of Coxsackie virus infections. Dr. Torsten Johnsson in my laboratory is responsible for this program and will publish the results in greater detail in a series of papers. Several hospitals cooperated with the laboratory in the studies now to be described.

Specimens were obtained from the majority of those patients in whom meningeal involvement was established by lumbar puncture. Included were practically all cases of paralytic poliomyelitis. Samples were often collected before the suspected meningitis was confirmed. Sometimes the diagnosis could not be verified and these cases finally formed a fairly adequate control group, the ultimate diagnoses ranging from pharyngitis, tonsillitis, and scarlet fever to pneumonia. The material selected for examination consisted of spinal fluid, throat swabs, and stools,

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collected on admission, and in addition acute and convalescent serum samples. During the first phase of the study, infectivity tests were regularly performed on all types of specimens.

However, as stools were soon found to be by far the most reliable source of virus, in the later stages, stool specimens were examined first hand and the other types of material were only complementary in cases in which the stools had vielded a positive result. In order to exclude as far as possible false positive results on account of laboratory pick-ups, fairly rigid criteria were applied. Thus, generally a result was considered positive only when (1) virus was recovered in repeated attempts from the original material or from any other specimen from the same patient, and (2) the convalescent serum contained neutralizing antibodies against the strain isolated. Preferably a rising titer should be demonstrated. This, however, is usally not possible unless the acute phase serum is drawn before the fifth day of illness.

The study was initiated in May 1949. In the course of four years, a total of more than 3,000 patients were examined and 117 strains of Coxsackie virus were isolated, representing all of Dalldorf's types A1 to 10 and B1 to 4, except type A3. In addition, a few as yet nontypable strains were encountered (table 1).

As the material from the Stockholm Hospital for Infectious Diseases was more systematically studied than the rest, this will be presented in greater detail. During 1949 through 1952, altogether 430 patients with paralytic poliomyelitis were admitted. As present Swedish law requires isolation of cases of poliomyelitis and treatment

TABLE 2
THE STOCKHOLM HOSPITAL FOR INFECTIOUS DISEASES.
NUMBER OF CASES OF ASEPTIC MENINGITIS AND
PARALYTIC POLIOMYELITIS ADMITTED IN 1949-1952.

	Aseptic meningitis			Paralytic poliomyelitis				
	Children*	Adults	Total	Children	Adults	Total		
1949	54	64	118	80	116	196		
1950	41	60	101	67	115	182		
1951	37	88	125	13	15	28		
1952	39	78	117	9	15	24		
Total	171	290	461	169	261	430		

Children—15 years old or younger.

in the hospital is free of charge, practically every observed and certainly all reported cases in Stockholm are admitted to this hospital.

During the same period, 461 patients were diagnosed and treated for nonparalytic poliomyelitis, ascptic meningitis, and so forth. The common main clinical feature was a febrile illness with pleocytosis but without paralysis or obvious signs of encephalitis. This group does not include postinfectious encephalomeningitis (measles or mumps). In addition, a total of 23 patients with encephalitis were admitted. Most of these did not display any typical symptoms, and the diagnosis rested entirely upon results of electroencephalography. The occurrence of paralytic poliomyelitis and aseptic meningitis is summarized in table 2 and figure 1.

The figures show that epidemics of poliomyelitis occurred in 1949 and 1950, whereas Stockholm was almost free from the disease in 1951 and 1952. Nevertheless, aseptic meningitis appeared at practically the same rate each year.

Unfortunately the figures are not directly com-

TABLE 1
SEASONAL AND TYPE DISTRIBUTION OF COXSACKIE VIRUSES ISOLATED IN
SWEDEN DURING THE PERIOD 1949-1952.

											OD IS						
Type:	AI	2	3	4	5	6	7	8	9	10	B1	2	3	4	X*	ND**	Total
Jan.				1			1			1			2	1			6
Feb.																	
Mar.													1				1
Apr.		1										1					2
May													1				1
June					1							1					2
July	2					1				1							4
Aug.		3		3	1		1				1	1	12	1			23
Sept.	3			7	2	1	1			8		1	7	2	2	2	36
Oct.		1		9	3			1	2	3		1	4	1	2	1	28
Nov.		1			1					2			5		1	1	11
Dec.				1	1	1											3
Total	5	6		21	9	3	3	1	2	15	1	5	32	5	5	4	117

O Strains not falling into any one of the listed immunological types.

o Adults—16 years old or older.

<sup>°°</sup> Strains not yet typed.

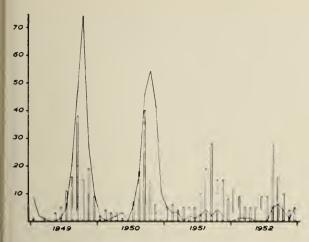


Fig. 1. Monthly incidence of cases of paralytic poliomyelitis (curve) and aseptic meningitis, including nonparalytic poliomyelitis (columns), admitted to the Stockholm Hospital for Infectious Diseases during 1949-1952.

parable. Isolation is not required for aseptic meningitis. Although practically all adults with this syndrome are admitted to the Hospital for Infectious Diseases, some children so diagnosed may be treated in open wards in various children's hospitals or at home. By checking the records of the children's hospitals in Stockholm, we found a total of 22 such cases in the whole period. Even with this correction we suspect the figures in table 2 are not representative of the true morbidity rates, and for the following reason. In years when poliomyelitis is prevalent, the diagnosis of nonparalytic poliomyelitis is apt to be considered more often than in years free from poliomyelitis and, consequently, proportionately more patients are admitted to isolation wards. Furthermore, probably this process of selection affects children and adults differently. Aseptic meningitis in a child is usually a minor affair, and does not require hospital treatment except on social indications. In many cases, therefore, admission to the hospital is not contemplated unless poliomyelitis is suspected. In adults, on the other hand, medical or social indications are the main reason for admission whether poliomyelitis is suspected or not. Thus, the relative rate of admission is probably less influenced by the epidemiologic situation.

Some evidence in support of this assumption is found in table 3, where the figures from table 2 have been rearranged.

While in the group of those with paralytic poliomyelitis, the ratio of adults to children is about the same in 1949 and 1950 as in 1951 and 1952, it rises from 1.3 in 1949 and 1950 to 2.2 in 1951 and 1952 in the meningitis group. Thus, proportionately 40 per cent fewer children were hospitalized in the period free from poliomyelitis. On the basis of the above reasoning, the figures concerning the adults appear more reliable than those of the children, and the actual increase in the later half of the period of 34 per cent among adults might presumably represent the true trend. Therefore, an inverse relationship would seem to exist between paralytic poliomyclitis and aseptic meningitis in the period under study (table 3).

The monthly case incidence is summarized in figure 1. Although the seasonal distributions of the two syndromes are conspicuously similar, a closer study reveals that they are by no means identical. The incidence of aseptic meningitis starts rising earlier and reaches its peak about one month before that of paralytic poliomyelitis.

The information contained in the statistical data may be interpreted as follows. The seasonal distribution of aseptic meningitis suggests fecal or possibly arthropod-borne agents as the primary cause. In our case—when Leptospirae and the encephalitides can be ruled out—the poliomyelitis and Coxsackie viruses are left as the main suspects. The data indicate inhomogeneity, that is, more than one etiology. Different strains or immunologic types of poliomyelitis virus with varying pathogenicity could be responsible, or some completely different viruses could also be involved. If so, the apparent inverse relation of paralytic poliomyelitis to aseptic meningitis suggests some kind of antagonism between the causative agents. Which possibility is the more probable can only be decided on the basis of laboratory findings.

For a laboratory test to be considered completed, the requirements previously stated had to be fulfilled. This was possible in approximately 70 per cent of the cases. A preliminary compila-

TABLE 3
CASES OF ASEPTIC MENINGITIS AND PARALYTIC POLIOMYELITIS ADMITTED TO THE STOCKHOLM HOSPITAL FOR INFECTIOUS DISEASES IN THE PERIODS 1949-50 and 1951-52.

	Aseptic meningitis			Paralytic poliomyelitis				
	I: Children	II: Adults	Ratio II/I	I: Children	II: Adults	Ratio II/I		
1949/50	95	124	1.3	147	231	1.6		
1951/52	76	166	2.2	22	30	1.4		
Difference	-20%	+34%						

tion of the results of the search for Coxsackie viruses is shown in table 4. The group having Bornholm disease does not belong to the Stockholm material but has been included for comparison as representing a disease of reasonably well established Coxsaekie virus etiology.

The uneven seasonal distribution of Coxsackie infections necessitates eaution in the evaluation of the figures of table 4. If, for instance, the miscellaneous group had been collected for the most part in the spring, a comparison with the other groups would earry little significance. As a matter of fact, this group falls within approximately the same season as the others and a statistical homogeneity test is thus justified. It shall only be stated that the difference between miscellaneous and paralytic poliomyelitis is insignificant, whereas the figures in the groups with aseptic meningitis and Bornholm disease are significantly higher than the figures of the controls.

TABLE 4
RESULTS OF TESTS FOR PRESENCE OF
COXSACKIE VIRUSES.

Diagnosis	Number tested	Number positive	Per cent
Aseptic meningitis/children	105	. 15	14.3
Aseptic meningitis/adults	206	9	4.4
Paralytic poliomyelitis/children	117	2	-1.7
Paralytic poliomyelitis/adults	183	2	1.1
Bornholm disease/total	20	7	35
Miscellaneous/total	97	0	

Our material eontains no indication that Coxsackie viruses are of such ubiquitous occurrence as some American authors have suggested. Neither is the combination of paralytic poliomyelitis and Coxsaekie virus infection as frequent as described by, inter alios, Mclnick and associates. In the 20 cases of Bornholm disease, the appearance of neutralizing antibodies in high titers proved that all patients had passed an infeetion with Coxsaekie virus type B3. They were all examined during the acute stage of the disease, a time that must be eonsidered optimal for the demonstration of virus. In spite of this, only one third yielded a positive result. The reasons for our relative failure are not entirely known. To some extent variations in the mouse pathogenicity of the virus are probably responsible. Against the background of this fact, the recovery rate in the aseptic meningitis group assumes a higher significance in spite of the comparatively modest results.

Systematic serologic examinations of paired sera would undoubtedly form a safer method of

arriving at a more reliable estimate of the frequency of Coxsackie virus infections. However, the large number of immunologically different types makes this procedure extremely time and labor eonsuming and quite unsuited for large seale routine investigations. Thus, with the technical resources available at present, to appraise the actual importance of Coxsackie viruses by applying only the methods hitherto described scarcely seems feasible. To obtain additional information, we have resorted to field investigations.

The field studies were initiated in the autumn of 1950 in connection with an outbreak of Bornholm disease in Jönköping-Huskvarna. A preliminary account of clinical and laboratory findings during the outbreak has been published (Gabinus, Gard, Johnsson, Pöldre, 1952). Johnsson later attempted a complete survey of the epidemic, including studies of the level of immunity in different population groups within and outside the epidemic area. In the course of this work, it became evident that a more extensive examination of households in which cases of Coxsackie virus infection were observed was a very useful method of approaching the general problem. Therefore, in the autumn of 1952, Johnsson studied 31 such families comprising 117 persons. Coxsackie viruses of the same immunologie type were recovered from more than 1 member in 8 families with a total of 35 members. This finding was taken as indicative of a true family infection, and the last mentioned 8 families were selected for a special study.

During the Jönköping-Huskvarna epidemic a conspicuously large number of cases of aseptic meningitis appeared in close epidemiologic connection with typical cases of pleurodynia. The laboratory evidence indicated a common etiology, namely Coxsackie virus type B3. Studying the symptomatology of the total of 85 cases that could be traced by their epidemiologic connections, Johnsson found a considerable variation in the clinical pieture, which according to the predominating symptoms was classified as aseptic meningitis, pleurodynia, myalgia, or minor illness.

The decisive criterion of meningitis was pleocytosis, often revealed by lumbar puneture in persons without any outward signs or symptoms indicating a meningeal involvement. Under such conditions the rate of aseptic meningitis can be estimated only in those who were hospitalized and subjected to a spinal tap.

The criterion of pleurodynia in its restricted sense was thoracic stitch or "the devil's grip."

In some cases a dry pleuritis was diagnosed.

Muscular ache or tenderness apart from the typical intercostal pleurodynia was classified as myalgia. Abdominal pains were included, even if the localization to the abdominal wall could

not always be strictly proved.

Cases of fever, headache, and/or vomiting without meningeal, pleural, or muscular involvement were designated as minor illness. As these patients only occasionally were hospitalized and lumbar punctures performed, some so classified might actually have suffered from a mild menin-

gitis.

In the material collected by Johnsson, data concerning types of subgroup A viruses are so far too few to justify conclusions. Concerning B viruses, however, and, more specifically type B3, a fair amount of information is available. The etiologic importance of this type seems to be established beyond doubt. Virus was recovered from an average of 45 per cent of the cases. Neutralizing antibodies were consistently present in convalescence; a rising titer in the course of the disease was observed in a fair proportion of the patients and consistently when the first serum was obtained on the fourth day of illness or earlier. Finally, the different symptoms observed were reproduced in 4 persons who accidentally acquired B3 infections in the laboratory (Johnsson 1953). This chain of facts seems to provide evidence as conclusive as has been produced for any other virus infection.

If all the figures are summarized and broken down, we obtain the following statistical data. Of the members in exposed households, roughly 90 per cent showed evidence of infection-serologically or otherwise. Of those infected, 75 per cent developed symptoms and no less than 32 per cent were shown to suffer from meningitis with or without additional symptoms. As a matter of fact this type of reaction to infection seemed to be more frequent than the classical syndrome of pleurodynia which appeared in only

24 per cent.

Although it cannot be excluded that some strains of virus are more apt to produce a pleurodynia-like picture, others displaying a more neurotropic quality, evidence suggests that the age of the patient is of great importance as a factor determining the clinical course of the infection. While pleurodynia was diagnosed in 53 per cent of the adults as against only 17 per cent of the children, meningitis was decidedly more common in children. The figures in this respect carry less significance, as the diagnosis can be established with certainty only by lumbar puncture. Of those subjected to this test, 30 per cent of

20 adults and 77 per cent of 26 children showed pleocytosis. The general trend was the same in 1950 as in 1952.

It would seem, therefore, that in a population with previous experience of Coxsackie virus type B3 and, consequently, with a certain proportion of the older age groups in possession of immunity to infection, introduction of the virus would give rise chiefly to an epidemic of aseptic meningitis among children. On the other hand, in a largely nonimmune population, a fair proportion of adults can be expected to be attacked, reacting clinically with pleurodynia. Because of the more dramatic quality of this syndrome, it attracts more attention than the generally milder meningeal reactions and presses its stamp upon the epidemic as a whole.

In 1952, Denmark suffered from a severe epidemic of poliomyelitis centered in and around Copenhagen. In spite of the heavy traffic between Sweden and Denmark, more than two months passed before any cases were observed in Malmö on the Swedish side of the channel just opposite Copenhagen. We decided to study the Malmö epidemic as thoroughly as possible, taking advantage of the experience accumulated in

previous field investigations.

Specimens were obtained from all persons hospitalized under the diagnoses of poliomyelitis or meningitis and from the majority of their household contacts, about 500 persons altogether. Infectivity tests were performed on the stool samples in baby mice and in tissue culture. A crop of about 50 strains of Coxsackie viruses representing 7 types (A1, 4, 5, 6, 9, 10, and B3) was harvested. In addition, about 90 strains of poliomyelitis virus type 1 and a few so far not identified strains of virus were isolated in tissue culture. All isolations were checked by serologic examinations.

In only 1, out of more than 140 positive cases, a mixed infection with poliomyelitis and a strain of Coxsackie virus was demonstrable. Combinations of 2 types of Coxsackie viruses were likewise very rare. Thus, each type of virus seemed to be disseminated independently, although simultaneously with the others. Geographic distribution of the positive findings was not suggestive of a mixed dissemination either.

Until December 31 a total of 68 paralytic cases were recorded and 66 persons were hospitalized as cases of nonparalytic poliomyelitis or aseptic meningitis. To what extent the different viruses found were etiologically responsible for the latter group of cases cannot be definitely stated, as the time consuming serologic analysis of the material has not yet been completed. However, a rough

estimate may be possible from the following facts.

Figure 2 shows diagrammatically the accumulated weekly incidence of paralytic poliomyelitis and meningitic manifestations. It is obvious that the incidence in the latter group was higher in the first half of the period, while paralytic poliomyelitis occurred at an approximately constant rate or possibly with a maximum in the second half. Thus, the 50 per cent mark was reached in the meningitis group about six weeks carlier than in the paralytic group. The week beginning October 19 marks the time when a drop in the rate of nonparalytic cases becomes manifest. It is probably more than a coincidence that not a single strain of Coxsackie virus was recovered in specimens collected later than October 18, while poliomyelitis virus was encountered about as often as before that date.

On the basis of this admittedly circumstantial evidence, some tentative conclusions may be drawn. Provided that the case rate after October 19 represents the true incidence of nonparalytic poliomyelitis, this type of manifestation represents roughly one third of the total number of clinical cases of poliomyelitis. The excess morbidity during the first two months is then probably attributable to infections with the other viruses recovered only during that period, meaning that about 50 per cent of the total number of meningitic cases in this epidemic probably were nonpoliomyelitic.

The findings here described seem to offer an answer to some of the questions raised in 1925 by Wallgren. It must be remembered that Wallgren in his paper dealt with observations made in Sweden. I believe that it can be safely stated that the situation with which he was concerned was different from the one found, for instance, in the United States where most of the infectious agents mentioned in the introduction seem to play a significant part in the etiologic make-up of aseptic meningitis. The point is that, while the *syndrome* described by Wallgren has been proved to be of a decidedly nonspecific nature, the disease he observed might represent a nosologic entity, even if it might not be etiologically strictly homogeneous. No doubt some epidemics such as that which occurred in 1950 in Jönköping-Huskvarna represent etiologic entities in the strictest sense of the word. However, possibly others are mixed epidemics in which several types of Coxsackie viruses, poliomyelitis viruses, and maybe additional, still unsufficiently known "fecal" viruses are involved, the prerequisite of the simultaneous appearance being similar habitats and modes of dissemination of the respective

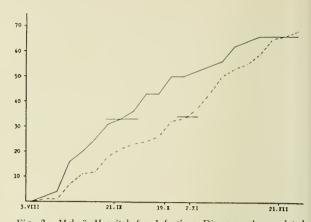


Fig. 2. Malmö Hospital for Infectious Diseases. Accumulated weekly admission of cases of aseptic meningitis (uninterrupted line) and paralytic poliomyelitis (dotted line). Horizontal cuts indicate 50 per cent mark.

viruses. Obviously further studies are necessary for a definitive statement.

The fact that Wallgren regarded aseptic meningitis as a new disease is of interest. In view of the essentially benign nature of the illness and its sometimes rather diffuse clinical character, its existence might, of course, previously have been easily overlooked and attention directed to it only because such diagnostic procedures as lumbar puncture were coming into more general use, and improved medical service permitted hospitalization also in cases where the indications were not exactly vital. However, considered in the light of our present knowledge, Wallgren's assumption gains in probability. If, namely, we keep in mind the very probable etiologic connections between aseptic meningitis and the Bornholm disease, the appearance of both diseases at roughly the same time and in the same regions must be regarded as more than coincidental. The typical syndrome of pleurodynia is not apt to be overlooked or mistaken for some other condition. Thus, there are strong reasons to believe that when the Bornholm disease was first observed in epidemic proportions during the first decades of the 20th century, it was essentially a new disease. The parallels to the epidemiologic behavior of poliomyelitis are striking, placing both diseases in the same category, that of diseases of civilization.

The present observations also serve to illustrate the difficulties to be expected in studies of the epidemiology of poliomyelitis. As long as clinical observations and epidemiologic connections are employed exclusively without facilities for virus studies, the impossibility of distinguishing clinically between nonparalytic cases of different etiologies, and the complicated pattern of simul-

# Gallbladder Diseases Among the American Indians

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Diseases of the biliary tract are prevalent among the various tribes of the American Indians residing in South Dakota, North Dakota, and Nebraska. The literature has been reviewed, but no previous report on this subject has been found. Therefore, the purpose of this paper is to give the incidence and to discuss some of the dietary, surgical, and other clinical aspects of such disease conditions as well as the incidence of cancer among these Indians. The study is based on the experience at the Pine Ridge Indian Hospital in South Dakota and covers a period of about two and a half years from 1951 to 1953.

The majority of the patients in this area are of the Oglala Sioux tribe, of which about a half are full-blooded, and live either on the Pine Ridge Reservation or in Nebraska. The other patients were referred to Pine Ridge and include the Sioux from the Rosebud and Cheyenne River areas in South Dakota, the Standing Rock Sioux from North Dakota, and the Chippewa of Turtle Mountain, North Dakota (table 1).

TABLE 1
DISTRIBUTION OF PATIENTS ACCORDING TO TRIBES AND DEGREES OF INDIAN BLOOD

Tribe	Full blood	Mixed blood	Number in tribe
Pine Ridge Sioux	15	13	28
Rosebud Sioux	4	3	7
Cheyenne River Sioux	2	1	3
Standing Rock Sioux	2	1	3
Turtle Mountain Chippey	va 0	8	8
Winnebago	1	-	1
Total	24	26	50

There are 50 patients in this series. These consist of 9 males and 41 females. The age distribution is fairly well spread over the third to the seventh decades (table 2). The duration of the disease varies from one to seventeen years among

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TABLE 2
DISTRIBUTION OF PATIENTS
ACCORDING TO AGE AND SEX

Age group	Male	Female	Number ir age group
21-30	1	9	10
31-40	1	9	10
41-50	2	5	7
51-60	3	13	16
61-68	2	5	7
Total	9	41	50

the males and from one to twenty-six years among the females, with the average of five and six years respectively. In three-fourths of the group, the males average 5 ft. 9 in. in height and

TABLE 3
COMPARISON OF NUMBER OF
MAJOR SURGICAL PROCEDURES PERFORMED

Body system	Number of operations
Skin and subcutaneous tissue	11
Musculoskeletal system	68
Respiratory system	1
Cardiovascular system	1
Hemic and lymphatic systems	2
Digestive system	121
Stomach and intestines	11
Biliary tract	52
Appendix	20
Hernias	20
Others	18
Urogenital system	14
Endocrine system	9
Total	227

159 lb. in weight; the females, 5 ft. 3 in. and 148 lb. and each female patient has an average of 4.8 children.

During these two and one-half years, 52 operations on the biliary tract were performed. Compared with the 227 major surgical procedures on the body systems performed during the same period of time, the gallbladder, therefore, constitutes the most frequently encountered surgical disease among the tribes of American Indians

TABLE 4
PATHOLOGY OF AND OPERATIONS ON 50 PATIENTS

	Pathology	Operation	Remarks	Nui	nber
1.	Chronic cholecystitis with cholelithiasis	Cholecystectomy Cholecystectomy and choledochostomy Cholecystostomy Cholelithotomy Cholelithotomy	History of jaundice Previously ruptured Cancer (?) Empyema (?)	30 2 1 1	
	m . 1	Cholccystectomy and closure of duodenum	Internal fistula to duodenum	1	20
2.	Total Chronic cholecystitis with chole- lithiasis and choledocholithiasis	Cholecystectomy	Exploration and drainage of common duct through cystic duct	1	36
	Total	Cholecystectomy and choledochostomy	cystic duct	1	2
3.	Chronic cholecystitis Total	Cholecystectomy		4	4
4.	Chronic cholecystitis and cystic artery anomaly Total	Cholecystectomy		1	1
5.	Chronic cholangitis Total	Choledochostomy	History of jaundice	1	1
6.	Subacute cholangitis with choledocholithiasis Total	Choledochostomy		1	1
7.	Subacute cholecystitis with cholelithiasis Total	Cholecystectomy Cholelithotomy		1 1	2
8.	Chronic cholecystitis with chole- lithiasis, acute exacerbation Total	Hemicholecystectomy		1	1
9.	Gangrene of gallbladder with cholelithiasis Total	Cholecystostomy		1	1
10.	External biliary fistula  Total	Transplantation of external biliary fistula to duodenum		1	1
11.	Carcinoma Total	Expolratory laparotomy		2	2
To	al				52

in the South Dakota, North Dakota, and Nebraska area (table 3).

Of the 50 patients, 2 were operated upon twice. Of these, 1 patient had carcinoma, of which the diagnosis was tentatively but not definitely established during the first admission two and one-half months previously when a cholelithotomy was performed. The other was a case of external biliary fistula after a cholecystectomy. The pathologic findings for which the various surgical procedures were performed are presented in table 4. Of the entire series of 52 operations upon 50 patients, 43 were cases of stone, all of which were of the cholesterol variety in the gallbladder and in the common duct,

and 2 were cases of carcinoma. During the same period of time, 13 cases of cancer in the body systems were operated upon with the diagnosis established by pathologic examination (table 5).

Of the 50 patients, 33 had their gallbladder series taken at Pine Ridge. The roentgen findings are arbitrarily grouped as well defined, ill defind, and nonvisualized. A comparison of the roentgen studies and the actual pathology encountered discloses that a pathologic gallbladder with stones was visualized in less than one-half of the cases and that all of the nonvisualized gallbladders were pathologic (table 6).

The presenting complaints and physical findings among the 50 patients without special ref-

TABLE 5
CANCER AMONG THE AMERICAN INDIANS

Type and site of cancer	Degree of Indian blood
1. Dermatofibrosarcoma	
protuberans, back	4/4
2. Medullary carcinoma, breast	4/4
3. Lymphoma, retroperitoneum	4/4
4. Carcinoma, lip	2/4
5. Colloid adenocarcinoma, stomacl	n 4/4
6. Adenocarcinoma, grade III,	
large intestine	4/4
7. Undifferentiated carcinoma,	
biliary tract	3/4
8. Epithelial cell carcinoma,	
biliary tract	4/4
9. Adenocarcinoma, pelvis	2/4
10. Adenocarcinoma, prostate	2/4
11. Undifferentiated carcinoma, ovar	rian
or genital ridge	4/4
12. Squamous cell carcinoma, uterin	e
cervix, grade III	3/4
13. Squamous cell carcinoma,	
uterine cervix	2/4

erence to the underlying disease conditions are rather typical. Most common symptoms were right upper quadrant pain, nausea with vomiting, and food dyscrasia, occurring in 46, 30, and 30 patients respectively. The most common sign is right upper quadrant tenderness and is found in 30 cases.

Of the 30 patients with food dyscrasia, 38 have fatty food or greasy food intolerance. Other offending foods include beans, meats, dairy products, potatoes, cabbages, pastries, and onions, but whether the intolerance is due to the foods or the manner in which they are prepared is impossible to determine, since a large amount of animal fats are used in all.

A survey of the dietary conditions of the various tribes of Indians in this area discloses that a typical diet is common to all tribes. The ordinary food items are hot biscuits, potatoes, salt pork, beef, and beef tallow. Hot biscuits are

usually the baking powder variety which have been baked into loaves. They are eaten with grease instead of butter or in the form of fried buns, and are consumed in large quantities. Potatoes are usually served at two meals and are flavored with salt pork or its fats. Beef is usually boiled in large amounts of fat. Beef tallow is consumed in a great quantity and is an important part of the dict.

Other common foods include hot cake with lard or other shortening, oatmeal with evaporated milk, navy beans flavored with salt pork, spaghetti and macaroni, pudding with rice and raisin or with stewed dried wild fruits, coffec with evaporated milk during or between meals.

The foods are highly seasoned. Catsup, chili sauce, mustard, salt, and pepper are used in a large measure. The base of every dish at every meal is grease.

From the surgical standpoint, some aspects of this study are of special interest. General anesthesia with ether was used in all cases. In the first 6 cases, open drop ether was used throughout the procedure. In the subsequent 46 cases, a closed system of ether inhalation was used as maintenance anesthesia preceded by an induction with Pentothal Sodium and/or nitrous oxide in 6 cases and with cyclopropane in the remaining 40 cases.

Except for 1 patient in whom a right rectus incision was made primarily for the purpose of excising the scar of a previous cholecystectomy performed elsewhere, a subcostal oblique incision was made in all cases. A soft rubber Penrose drain was uniformly instituted except in 1 patient, and this omission was due to an oversight. Removal of the Penrose drain depends upon the amount of postoperative drainage. In 30 gallbladder operations, it was removed by the third postoperative day, and in 1 on the tenth

TABLE 6
COMPARISON OF ROENTGEN FINDINGS AND PATHOLOGY ENCOUNTERED

Roentge	enogram		Pathology			
		Chronic chole- cystitis with cholelithiasis	Chronic cholecystitis, cholelithiasis and choledocholithiasis	Carcinoma	Chronic cholecystitis	Number in roentgenogram group
Well-defined	with stones	10			1	11
	without stones	1			1 (Cystic duct	
					anomaly)	2
Ill-defined	with stones	3				3
		(1 acute)				
	without stones	5	' 1			6
Non-visualized		8	1	1	1	11
		(1 gangrene)				
Total		27	2	1	3	33

day. After operation upon the common duct, the Penrose drain was allowed to remain for eight to twelve days, whereas the T-tube was removed in twelve to twenty-one days, depending on the evidence of a free flow of bile through the common duct.

The average hospital stay for the 47 patients who had gallbladder operations was nine days, with two-thirds of them well enough to be discharged on the seventh day. For the 5 patients who had operations upon the common duct, the average hospital stay was eighteen days. Excluding the 2 patients with carcinoma involving the liver and who eventually succumbed, there were 4 cases of complications among the group of 50 patients. Persistent drainage of bile continued in 2 patients for thirty-two and thirty days, respectively, before the drainage spontaneously ceased. This condition occurred in 1 after cholelithotomy for subacute cholecystitis with cholelithiasis, and in the other after cholecystectomy and choledochostomy for chronic cholecystitis with cholelithiasis and choledocholithiasis. Paralytic ileus developed in 1 patient after cholelithotomy necessitating intestinal intubation and Wangensteen suction for six days. An external biliary fistula and common duct stenosis with persistent drainage and jaundice developed in I patient, and finally was relieved by the transplantation of the external biliary fistula into the duodenum. Because external biliary fistula is a relatively rare condition, this case is hereby reported in detail:

# CASE REPORT

I. P., No. 1374-52, a 57-year-old Chippewa Indian woman referred from Turtle Mountain, North Dakota, was first admitted July 9, 1952, with the chief complaint of intermittent right upper quadrant pain over a period of nine years with a loss of weight of 11 lb. over that period. General health in the past was good. There was no previous surgery or scrious illness. On physicial examination, the patient was found to be a moderately developed and moderately nourished Indian woman, weighing 112 lb. and measuring 61 in., apparently in no acute or chronic distress. There was a slight tenderness in the right upper quadrant, otherwise the physical examination was negative. Cholecystectomy was performed on July 17, 1952, and during the operation the gallbladder was found to be grayish-white in color, indurated in consistency, and firmly adhered to the liver bed by the entire posterior wall. When the gallbladder was opened, the wall was found to be fibrotic in appearance, and there were numerous gravel calculi and a few as large as 1 cm. in diameter. The specimen was submitted to the pathology laboratory, National Institute of Health for examination and was reported as chronie active cholecystitis-severe. The postoperative course was marked by persistent and rather profuse drainage of bile from the wound. At the time the patient was discharged on the seventeenth postoperative day, it was evident that an external biliary fistula was being

formed. She was advised to return to the Turtle Mountain Indian Hospital for care until further surgery would be deemed opportune.

The patient, No. 895-53, was again referred from Turtle Mountain for further treatment and was readmitted February 18, 1953. Since her discharge on August 3, 1952, bile drained profusely from the central portion of her wound. There were 2 episodes of fever, chill, and generalized abdominal pain suggestive of cholangitis and responsive to Terramycin. There was a history of general malaise and weakness, a sense of indigestion and abdominal fullness, clay-colored stools and a weight loss of 26 lb. to the present weight of 86 lb. Although ambulatory, she appeared cachectic and markedly jaundiced. A well established external biliary fistula had developed at about the midportion of the otherwise healed surgical scar. A transplantation procedure was contemplated and the patient was placed on a high-protein, high-vitamin diet with the addition of bile salt, multiple vitamins, and vitamin K. On March 4, 1953, transplantation of the external biliary fistula into the duodenum was performed. Guided by a small rubber catheter which was inserted into the lumen, the fistula was coned out down to the region of the common duct where adhesion prevented further dissection. A 2-cm. longitudinal incision was made in the duodenum near the end of the dissection of the fistula and, with a mattress suture of medium silk, the fistula was tagged under the lumen of the duodenum with the fistula opening directed toward the distal duodenum. The incision in the duodenum was then transversely closed by interrupted fine chromic catgut sutures, and a layer of interrupted fine silk sutures was used to anchor the fistula to the wall of the duodenum. Thus, when completed, the transplantation left the fistula about 2.5 em. inside the lumen of the duodenum and well anchored to the duodenum wall. A Penrose drain was left in place, and the abdomen was closed in layers. Postoperatively, vitamin therapy was continued, and 250 mg. of aureomycin was given every six hours. In addition, intermittent gastric suction, discontinued for two hours after each administration of aureomycin, was instituted and intravenous fluids were given. On the fourth postoperative day the suction was discontinued and the patient was placed on a low-fat soft diet with a liberal amount of fluid. The Penrose drain and sutures were removed on the fifth and eighth postoperative day respectively. The jaundice rapidly disappeared and the stools resumed the yellowish brown color. The patient felt hungry and in general very good. She was discharged on the twelfth postoperative day. The report from Turtle Mountain indicates that she has been well ever since.

# DISCUSSION

1. The only reference to the incidence of gall-bladder diseases among the American Indians was made by Salsbury¹ who reported an incidence of 1.5 per cent among the Navajos. In the present series, complete data are not available for Rosebud, Cheyenne River, Standing Rock, Turtle Mountain, and Winnebago. For the Oglala Sioux at Pine Ridge, South Dakota, during the period covered by the present report, there were 3,228 admissions of which 115 were for diseases of the biliary tract, an incidence of 3.6 per cent. Of the 115 cases of gallbladder dis-

eases, 28 were operated upon, a ratio of about 1 out of 4.

- 2. Cancer among the American Indians has always been considered rare. In 1930, Lee<sup>2</sup> reported that physicians unanimously agreed that cancer was seldom, if ever, found in full-blooded Indians. Hoffman, as quoted by Lce, concluded in 1928 that cancer did occur in full-blooded Indians but that the incidence was extremely low. Palmer<sup>3</sup>, in 1938, also expressed the opinion that cancer among the Indians was rare. In this series of 50 patients with gallbladder diseases, there were 2 cases of carcinoma of the biliary tract. During the two and one-half year period a total of 13 cases of cancer in the body systems were encountered in surgery. Incidence in fulland mixed-blooded Indians is about the same.
- 3. A conservative medical regime is preferred for the treatment of acute cholecystitis. As pointed out by Ogilvie,4 emergency operation for acute cholecystitis is believed to result in a higher incidence of morbidity and complications which could be disastrous. In this series, there are 6 cases of acute cholecystitis where surgical intervention was deferred from six weeks to three months when all evidences of the acute episodes had subsided.
- 4. According to Glenn,<sup>5</sup> choledochostomy is indicated in the following instances: (1) palpable stone within the common duct; (2) history of jaundice preceded by, or associated with, pain or intermittent fever; (3) thickened common duct wall with or without dilatation; (4) contracted gallbladder containing stones; (5) dilated cystic duct; and (6) enlarged head of pancreas. In the group under study, indications for choledochostomy were found in only 5 cases, 2 with palpable calculi and 3 with a history of jaundice without any gross incidence of hepatic or pancreatic disease. In 1 case of cholelithiasis and choledocholithiasis, exploration and evacua-

tion of stones were carried out through the cystic duct without opening the common duct.

- 5. Although the data on the gallbladder roentgen series are inadequate and, therefore, inconclusive, it is nevertheless interesting to note the physiologic basis of the mobilization and concentration of the dye in the gallbladder as outlined by Martin and Massimiano. They find that 82 per cent of nonfunctioning gallbladders show stones and 93 per cent show gross disease.
- 6. External biliary fistula is a rare and serious complication of biliary tract surgery. According to Eliot, the transplantation operation for this condition was first performed by Jenckel in 1905. Contributions to this procedure were substantially made by Lahey,<sup>8</sup> Walters,<sup>9</sup> and others. The first successful operation was performed by Williams<sup>10</sup> in 1914, and when the report of the case was published in 1929, the patient was living and well.

# SUMMARY

- 1. Diseases of the biliary tract are the most frequently encountered surgical conditions among the American Indians studied. During the period from 1951 to 1953, of the 227 major operations performed, 52 were upon the biliary tract.
- 2. Cancer among the American Indians is not rare. During the same two and one-half year period, there were 13 cases of cancer, including 2 of the biliary tract. Operations were performed after diagnosis by pathologic examinations.
- 3. Except for the 2 cases of carcinoma, mortality did not occur in this series.
- 4. A case of external biliary fistula with an apparently successful transplantation into the duodenum is reported.
- 5. A more than casual relationship is felt to exist between the diet and the prevalence of gallbladder diseases among these American Indians. However, further research on this phase of metabolism is indicated.

The author wishes to express his deep appreciation to his former colleague and staff at the Pine Ridge Indian Hospital and his former associates in the Aberdeen area of The Bureau of Indian Affairs for their fine cooperation without which this study could not have been undertaken.

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# Breast Tumors\*

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THE NATIONAL publicity campaign aimed at carly diagnosis of cancer and explaining the necessity for regular and repeated physical examinations has been most successful. Movies on such subjects as self-examination of the breast, which are shown to women's clubs throughout America, are bringing more and more women into doctors' offices because of the discovery of

a "lump in the breast."

It is important, therefore, for the physician to uphold his obligation to the patient in this matter. No doubt, some harm is being done by overexciting the person who already has multiple phobias, but if such a program results in the early diagnosis of carcinomatous lesions, the good far outweighs the harm. The decision that confronts most physicians in examining a breast tumor is not whether the lesion is malignant, but whether a biopsy is necessary. Of all cancer in women 24 per cent is found in the breast.

At this point, I would like to emphasize a statement made by my former chief, Dr. Stuart W. Harrington of the Mayo Clinic, "The more breast tumors I examine, the less I am able to predict the diagnosis." A biopsy should always be taken of a single mass, no matter how benign it feels. No greater feeling of incompetency can result than to have to admit that a lump one has been "watching" is malignant.

# DIAGNOSIS

History and examination. When obtaining the history, the following are important: (1) familial tendencies, (2) breast development in adolescence, (3) number of pregnancies with and without lactation and mastitis, (4) sexual and menstrual development, (5) thyroid function, (6) trauma, (7) nipple discharge, (8) character or absence of pain, and (9) duration of abnormality.

For the examination, the patient should be stripped to the waist and sitting erect. The skin, nipples, areolae, breasts, and axillae should be

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inspected carefully. The arms are then raised and lowered slowly. To be noted are: (1) size and pigmentation of nipples and areolae, (2) inversion or retraction of nipples, (3) symmetry, (4) bulges, and (5) character of development.

Palpation. The palmar surface with the fingers extended should always be used for palpation. The left breast and axilla are palpated with the right hand; the left hand is used for the right breast. The breast substance is compressed against the chest wall. Each quadrant is carefully palpated with the patient both lying down and sitting erect. With the patient's arm drawn over the chest wall to relax the pectoral muscle, the subpectoral and axillary space can be thoroughly examined for nodes.

If a mass is palpated, the size and location are noted. The following questions are details of importance: Are the edges sharp and well defined? Is the mass smooth or lobulated?

The consistency should be described as soft, granular, hard, resilient, or fluctuant. Mobility or fixation should be determined, as well as the rate of growth by the patient's history.

Transillumination may be helpful. The light source should be small and the intensity variable, depending on the size of the breast and the tumor. Fatty tissue and cystic masses are quite translucent, granular stroma is less so. Cancer sometimes transilluminates quite well, but is usually opaque. However, one should not depend too much on this method of diagnosis.

Roentgenograms. Hicken, Lockwood, and others have advised quite complicated roentgenray procedures. However, roentgenograms have little practical value in the diagnosis of breast tumors. Their importance lies in determination of skeletal and chest metastasis.

Aspiration biopsy. In accurate diagnosis of breast tumors, aspiration biopsy, an office procedure, probably has a place. The aspirated fluid may be misleading unless analyzed for cells. The fluid from a simple cyst is clear, but is blood-tinged from a cyst containing a papilloma. An abscess will, of course, show frank pus. Aspiration biopsy can be used if a solid tumor

<sup>&</sup>lt;sup>o</sup>Presented at the American Cancer Society, Aberdeen, South Dakota, 1952.

is suspected of being malignant and surgery cannot be performed. If a suspicious cyst does not completely disappear or collapse when aspirated, surgical biopsy is necessary.

### VARIETIES OF BREAST TUMORS

If in examining the breast, a palpable mass is found with or without tenderness, any of the following conditions are possible: (1) cystic mastitis, (2) a benign tumor such as fibroadenoma or papilloma, or (3) a malignant tumor.

A few generalities may be mentioned. A milky discharge is not significant and occurs normally in 3 per cent of women. A sanguincous dis-

charge must always be investigated.

Bleeding without a palpable mass is usually a sign of intraductal papilloma, but should be determined. The blunt end of a needle is inserted into the bleeding duct and incision is done along the course of the needle. The papilloma is easily exposed. Simple removal is all that is necessary.

Both cystic mastitis and carcinoma are more apt to occur in women who have never been pregnant. Fibroadenomatosis is essentially a disease of adolescence and early childbearing years. Cystic mastitis is a lesion of the childbearing age, while cystic disease and carcinoma are more frequent at the menopause and after. Acute mastitis occurs only during lactation or the puerperium. The growth rate of adenoma or carcinoma increases during pregnancy; cystic mastitis improves during pregnancy.

# CHRONIC CYSTIC MASTITIS

Although not entirely accurate (for a practical approach) chronic cystic mastitis can be subdivided into 3 stages: (1) mammary dysplasia, (2) adenosis or Schimmelbusch's disease, and

(3) cystic disease.

Mammary dysplasia, or mastodynia, is seen often in young girls. The complaint is bilateral soreness premenstrually, chiefly in the outer upper quadrant. The condition occurs in the low-fertility or sterile group. No definable masses are outlined; only a swollen, granular, painful area is found in an otherwise well-developed breast. No biopsy is required here, but if performed, the picture microscopically is one of stunted lobules with periductal fibrosis.

Adenosis, for practical consideration, is the next stage in a continuing chronic cystic mastitis. Again, the involvement is chiefly in the outer upper quadrant. The soreness is more apt to occur throughout the menstrual cycle rather than just premenstrually. This condition occurs in the low-fertility group.

The breasts are apt to be small and the edges

well defined. Instead of a granular sensation to palpation, the shape is now definitely nodular. Sometimes the nodules form a defined mass and biopsy is necessary for accurate diagnosis. Microscopically, epithelial proliferation, small cysts, and distortion of the lobule are found.

Cystic disease occurs in the mature woman and is apt to be bilateral and painful. While pathologically considered an advanced state of chronic cystic mastitis, cystic disease may appear in a previously asymptomatic breast.

On examination, a single well-rounded, tense, but movable mass is usually found. It transilluminates well. Aspiration biopsy may be of value if the fluid is clear and the mass collapses, but surgical biopsy is more accurate. Microscopically, the cyst wall is embedded in a dense fibrous stroma. There are few acini.

Treatment of chronic cystic mastitis. A deficiency of progesterone, or at least a relative hypercstrinism, is generally considered to be the cause of chronic cystic mastitis, though hormone imbalance cannot be demonstrated in these cases. Nevertheless, progesterone can be tried safely, with heat and good support of the breast.

Rarely is simple mastectomy necessary for severe or recurrent adenosis or cystic disease. Conservatism is the rule, but observation is essential until after the menopause. Most investigators do not find any association with the development of cancer, but Geshecter in a follow-up of 800 cases, finds the incidence of cancer to be 1.26 per cent in this group, whereas the usual rate is 0.4 per cent.

### BENIGN TUMORS

The two most common benign tumors of the female breast during the childbearing period are fibroadenoma and papilloma.

Fibroadenoma, a firm, movable tumor, usually occurs in a well-developed breast before the age of 30 and grows rapidly during pregnancy. If it grows to huge proportions, it is known as a myxoma.

Intracystic or intraductal papilloma, more common after the age of 30, is soft to tense and is accompanied with a bloody discharge from

the nipple in 50 per cent of cases.

Treatment in both instances is excision. Pathologic study should be done. About 5 to 10 per cent of papillomas become malignant, while a fibroadenoma rarely does. If a single papilloma is found, local excision is sufficient for cure. If extension to other ducts has occurred, radical mastectomy must be performed. Hematomas and lipomas of the breast are treated as such lesions are treated in other parts of the body.

The average length of life after diagnosis of a malignant tumor of the breast is four years. Only 40 per cent survive five years after radical treatment. While more common at the ages of 40 to 55, cancer of the breast may occur at any age. The younger the individual, the more hopeless the prognosis. Pain, unfortunately, is not a prominent early symptom. More often the lump is discovered accidentally while dressing. Discharge from the nipple may be the first symptom and occurs in about 3 to 5 per cent of cases.

The carcinomatous breast usually contains a single lump only and is rarely complicated by the presence of multiple nodules. The lump is hard and irregular and not tender on manipulation. The margins are poorly defined and the mobility is limited. Skin or nipple changes may or may not be present. Thus, important clinical findings are: (1) single lump in an otherwise normal breast, (2) hardness and irregularity of margins, (3) nearness of tumor to examining fingers, (4) limited mobility of mass, and (5) flattening or retraction of skin or nipple.

Sarcomas are rare. They arise from a fibroadenoma or stroma of the breast and grow rapidly. Treatment is the same as for carcinoma.

About 90 per cent of malignant growths of the breast are adenocarcinomas. Most of these are of the infiltrating or scirrhous type. On gross section, the mass is gritty, like an unripe pear, yellowish white, and usually not necrotic. The margins are not defined as in benign lesions.

Microscopically, the malignant cells grow in cords or small islands of moderate sized cells with hyperchromatic nuclei. Intervening fibrous tissue is prominent. Most of this resemblance is lost in the more rapidly growing tumors.

Rarer types of carcinomas include *low-grade* adenocarcinoma with a papillary or gelatinous structure and *Paget's disease*, which is composed of transitional epithelium.

Paget's disease generally occurs in the age group over 50 and has about a three-year history. Usually the nipple involvement is primary and the breast lesion secondary. The involved nipple is either red and granular or crusted and eczematous. Axillary nodes are palpable in 50 per cent of cases. Those without nodes grow more slowly and, of course, offer a better prognosis. Of this group, 75 per cent survive five years.

Acute inflammatory carcinoma is a rare tumor usually occurring in pregnancy or lactation. Rapidly developing, with inflamed overlying skin, fulminant carcinoma is caused by the retrograde extension of cancer cells through the skin

lymphatics. A low-grade fever and leukocytosis may occur. The prognosis is poor — about one year of life. Because of the rapid gland involvement and poor prognosis, radiation is the treatment of choice.

Prognosis. In general, 70 per cent of patients with breast carcinoma without axillary involvement survive five years, while only 20 per cent of those with involved nodes survive that long. This can be further broken down by grading the various forms.

Treatment. The treatment of choice for malignant tumors is radical mastectomy. Deep roentgen therapy follows and is particularly important if the axilla is involved. Distant metastases to bone, supraclavicular nodes, or chest wall indicate inoperability. Simple mastectomy or radiation alone may be sufficient for the aged or for those unable to withstand surgery.

As long ago as 1896, a Glasgow surgeon, Beaston, performed oophorectomy on women with mammary cancer. Since then, much experimental work has been done to clarify this relationship. While the clinical evidence suggests a definite relationship of breast cancer to ovarian function, definite proof of this connection is lacking. To date, castration offers no increase in survival rate, but effects are palliative in cases with metastatic lesions.

Reports on hormone therapy from 1939 to the present have been inconclusive and variable. In 1947 the American Medical Association surveyed groups treated with either stilbestrol or testosterone. The following suggestions were made:

- 1. No patient should have hormone therapy whose disease might be amenable to surgery or irradiation.
- 2. Estrogen is to be used for patients over 60 whose lesions are predominantly in the soft parts, and testosterone for those of all ages whose lesions are predominantly in the bones.

Associated physiologic changes, such as hirsutism, acne, deepening of the voice, and increased libido may be unpleasant. Both stilbestrol and testosterone are metabolic stimulants and usually induce weight gain and general wellbeing. Certainly, dramatic results occasionally take place, both subjectively and objectively, in an otherwise doomed patient suffering severe pain. After hormone therapy is instituted, it must be continued even though relief occurs. Treatment can be initiated by giving 25 mg. of testosterone propionate three times weekly. This dosage may be reduced to just below the level at which unpleasant side effects occur. We do not use stilbestrol.

Biopsy technics. To perform a biopsy, a radial

incision is usually made over the tumor mass. If the odds favor a benign lesion, a Warren incision may be desirable. If not over 5 cm. in diameter, the mass is removed entirely, together with some of the surrounding tissue. If greater than 5 cm., a small wedge can be taken, which should be cut while fresh. The gross diagnosis of malignancy can be made in 90 per cent of the cases. The pathologist must substantiate the diagnosis. This is done preferably with frozen section.

The open wound is packed with saline-soaked gauze if the tumor seems at all suspicious. If the tumor is definitely benign, a hemostatic closure is made. A small drain is always inserted.

Technic of radical mastectomy. Extension of the tumor cells may be direct, by the lymphatics, or less often, through the blood stream.

The general plan then is to excise completely with a safe margin of normal tissue in order to include the pathways of the lymphatics. The success of this operation depends upon the thoroughness with which the dissection of the lym-

phatic system takes place.

The Halsted incision modified by Finney is probably the most universally adopted incision. Beginning at the coracoid process and extending around the breast nearly to the umbilicus, the area of malignancy should be surrounded by a wide margin, even if grafting must be used for closure. With a large breast, enough skin must be taken to make a tight closure. Healing is more apt to be primary if the flaps are tightly drawn over the chest wall. Care in handling the tissue is important to prevent traumatic spreading of malignant cells.

Dissection af the deep fascia is immediately carried out along the sternal border and laterally along the edge of the latissimus dorsi. Division of the pectoralis major at its insertion is next, but the clavicular portion is left intact. The lateral thoracic and pectoral branches of the axillary vessel are ligated. On the medial side, the perforating branches and the internal mammary also must be ligated. Meticulous care in cleaning out all fascia, fat, and gland-bearing tissue is well warranted. Tissue should be removed even down to that surrounding the outer layer of the blood vessels. If the axillary vein

is involved, the surgeon should not hesitate to resect it.

The following landmarks should be identified: (1) medially, the origin of pectoralis major and the fascia at the junction with the sternum, (2) laterally, the border of the latissimus dorsi and the insertion of the pectoralis major in the humerus, (3) superiorly, the cephalic vein or clavicle, and (4) inferiorly, the fascia overlying the rectus abdominis.

When the dissection is completed, the patient should be allowed to awaken partially so that questionable bleeding areas can be found. Thorough hemostasis is well worth the extra time involved. After closure, the chest wall is bound with wide roller bandages to compress the operative site and decrease bleeding and drainage. The site should be well drained, especially the axillary and clavicular areas. If more skin than can be approximated is removed, the uncovered areas are grafted by skin taken from the thigh.

The operative mortality in experienced hands is about 1 per cent. Shock is a potential feature because of blood and heat loss and because of the time required for careful gland dissection. Preparation should always be made for the proper anesthetic and for blood transfusions. Heroic procedures such as shoulder girdle amputations are not considered choice acts.

Treatment of metastatic cancer. Although no particular procedures are promising in cases of metastatic cancer, palliation and possible extension of life are worth all trials. Secondary irradiation and hormones have given more consistent relief than procedures such as castration and cautery, or the use of chemicals and other hormones. Adrenalectomy is experimental but may offer some hope.

# CONCLUSIONS

An attempt is being made through national campaigns to alert women to the possibility of breast cancer and bring patients to the doctor early. From there on it is the doctor's duty to make a diagnosis as soon as possible. Further, it is the duty of the physician to reassure the patient who has a benign condition.

Any definite nodule calls for a biopsy. Types are described and treatment outlined.

# PEDIATRICS GRAND REUNION

# In Honor of

# DR. IRVINE McQUARRIE

On the 25th Anniversary of His Distinguished Service to the University of Minnesota – In Conjunction with the Annual Northwestern Pediatric Society Meeting.

SEPTEMBER 1954 will mark Dr. Irvine McQuarrie's twenty-fifth year of service to the University of Minnesota as professor and head of the department of pediatrics. During this period, Dr. McQuarrie and the pediatricians who have studied with him and trained under him have contributed immeasurably to the maintenance and improvement of the health of children in our area and throughout the world. From Dr. McQuarrie's department at the University of Minnesota have come more of the leading professors, teachers, and medical scientists than from any department in the United States. In addition, Dr. McQuarrie's leadership in the field of pediatrics has enriched the lives of all of us in this community.

A Pediatric Grand Reunion and homecoming revolving around a two and one-half day scientific medical program is being planned. The members of the Northwestern Pediatric Society have indicated their interest and desire to cooperate by holding their annual meeting on the campus of the university and inviting former residents who have achieved prominence in the field of pediatrics and other distinguished individuals to participate in the scientific meeting. The scientific papers presented at this meeting will be published in a "Festschrift" in Dr. McQuarrie's honor. We are sure that all who have been associated with Dr. McQuarrie and the department of pediatrics in the past will plan to return to participate in this reunion and scientific meeting.

The committee in charge feels that this occasion is an ideal time to establish a "McQuarrie Pediatric Fund." The purpose of this fund is to accumulate gifts to meet needs of pediatric education not currently being met. Included will be the inauguration of an annual McQuarrie Lectureship, furnishings for the pediatric staff lounge and library in the new Mayo Building, a travel fund for residents and junior staff members, and support of other educational activities. This undertaking will benefit all who are mutually interested in pediatric education and have already benefited from the work of the department of pediatrics.

A number of pediatricians have already contributed \$100 to \$300 each to launch this project. It

is the earnest hope of the committee that everyone will respond in such manner as he feels able, so that we may go forward and present the McQuarrie Fund with the prestige it deserves as part of this outstanding celebration.

Gifts or pledges to this project will be channeled through the Greater University Fund. They should be made payable to the University of Minnesota and may be mailed to the Secretary-Treasurer of our Committee, Dr. Robert A. Good, Department of Pediatrics, University of Minnesota.

The scientific program to be presented September 23, 24, and 25, is as follows:

# THURSDAY, SEPTEMBER 23, 1954 Presiding – Dr. S. Lane Arey

- 9:00–9:15 a.m. Introduction, Dr. Erling S. Platou, Clinical professor of pediatrics, University of Minnesota
- 9:20–10:10 a.m. "Pediatric Progress During the Past Twenty-five Years" — Dr. L. Emmett Holt, Jr., Professor and head of pediatrics, New York University
- 10:15–10:45 a.m. "The Relationship of Pediatric Practice to Preventative Medicine and Public Health"
   Dr. Herman E. Hilleboe, Commissioner of health, Albany, New York
- 11:00-11:30 a.m. "Some Observations on Pediatric Education" Dr. Lee Forrest Hill, Chairman, committee on medicinal education, American Academy of Pediatrics (Des Moines), past president American Academy of Pediatrics
- 11:45–12:15 p.m. "Teaching Techniques in Pediatrics"

  Dr. Ralph V. Platou, Professor and head of pediatrics, Tulane University
- 12:15–12:30 p.m. "Presentation of the McQuarrie Pediatrics Fund" Luncheon (Junior Ballroom, Coffman Memorial Union) Dr. Erling S. Platou, Clinical Professor of Pediatrics, University of Minnesota

# Presiding - Dr. Erling S. Platou

2:00–2:30 p.m. – "Twenty-five Years Experience with the Reticuloendothelioses" – Dr. Roger L. J. Kennedy, Mayo Clinic, professor of pediatrics, Mayo Foundation, University of Minnesota

- 2:40–3:10 p.m. "The Evaluation of Pituitary Adrenal Function" – Dr. Robert S. Ely, Assistant professor of pediatries, University of Utah
- 3:20–3:50 p.m. "The Effect of Cortisone on Nucleic Acid Metabolism" – Dr. Charles U. Lowe, Associate professor of pediatrics, Buffalo, New York
- 4:00–4:30 p.m. "Essential Fatty Acids and Vitamin Bu Clinical Implications and Interrelationships" Dr. Arild E. Hansen, Professor and head of pediatrics, University of Texas; Dr. Hilda F. Wiese, Assistant professor of pediatrics, University of Texas
- 4:45–5:15 p.m. "Surface Area as an Estimate of Body Maturity" – Dr. Allan J. Hill, Jr., Professor and head of pediatrics, University of Oregon
- 5:15 p.m. Business Meeting of the Northwestern Pediatric Society

# FRIDAY, SEPTEMBER 24, 1954

Presiding - Dr. Lewis Thomas

- 9:00-9:30 a.m. "Pediatric Implications of Recent Research in Porphyrin Metabolism" Dr. Robert A. Aldrich, Associate professor of pediatrics, University of Oregon
- 9:45–10:10 a.m. "The Diagnosis and Management of Adreno-cortical Insufficiency in Infants" – Dr. Theodore C. Panos, Professor of pediatrics, University of Texas
- 10:10-10:30 a.m. "Paper Chromatography Studies of Blood and Urine Carbohydrates" — Dr. Robert A. Ulstrom, Assistant professor of pediatrics, University of California at Los Angeles
- 10:30–11:00 a.m. "Recognition of Abnormal Forms of Hemoglobin in Human Disease" – Dr. Robert H. Alway, Professor and head of pediatrics, University of Colorado
- 11:15-11:45 a.m. "The Role of the Pituitary Adrenal System in Rheumatic Fever" — Dr. Vincent C. Kelley, Associate professor of pediatrics, University of Utah
- 12:00–12:30 p.m. "Studies on the Etiology of a Human Respiratory Disease" – Dr. John Adams, Professor and head of pediatrics, University of California at Los Angeles

# Presiding - Dr. Samuel Amberg

- 2:00–2:30 p.m. "Deglutition" with special reference to pharyngeal disability in poliomyelitis — Dr. James F. Bosma, Professor and head of pediatrics, University of Utah
- 2:40–3:10 p.m. "Metabolic Studies in Premature Infants" Dr. E. Perry Crump, Professor and head of pediatrics, Meharry Medical College
- 3:20–3:50 p.m. "Metabolic Observations on the Central Nervous System" Dr. John A. Anderson, Professor and head of pediatrics, Stanford University
- 4:00—4:30 р.т. "Recent Advances in Diagnosis and Treatment of Convulsive Disorders in Childhood" — Dr. Haddow M. Кетти, Mayo Clinic, Associate professor of pediatrics, Mayo Foundation, University of Minnesota
- 4:40–5:10 p.m. "Pathologic Lesions Responsible for Respiratory Disturbances in the Newborn" — Dr. James B. Arey, Pathologist, St. Christopher's Hospital for Children, Philadelphia

# SATURDAY, SEPTEMBER 25, 1954

Presiding - Dr. Raymond Jensen

- 9:00–9:30 a.m. "Review of the Developments in the Relationship Between Homeostatic Processes and Behavior" – Dr. R. L. FAUCETT, Staff member, Mayo Clinic, Rochester, Minnesota
- 9:40–10:10 a.m. "Behavioral Manifestations of Diffuse Brain Damage in Children, Clinical Features and Diagnostic Criteria" — Dr. Hunter H. Comlly, Assistant professor of pediatrics and psychiatry, University of Iowa
- 10:10–10:30 a.m. "Discussion of Horizons in Child Psychiatry" – Dr. Reynold A. Jensen, Professor of pediatrics and child psychiatry, University of Minnesota
- 10:40-11:10 a.m. "Heart Disease in the Infant" Dr. Forrest H. Adams, Associate professor of pediatrics, University of California at Los Angeles
- 11:20–11:50 a.m. "Parapertussis," "Looking Forward in Pediatrics" Dr. William L. Bradford, Professor and head of pediatrics and assistant dean, University of Rochester, New York.



This department of The Journal-Lancet is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.

# Familial Hemolytic Jaundice with Mongolism and Diabetes Mellitus

DAVID A. SHER, M.D., and HAROLD H. JOFFE, M.D.

Virginia, Minnesota

THE LITERATURE on familial hemolytic jaundice is voluminous, and we do not intend to present a detailed review of the subject. The purpose of this paper is to report an interesting case of familial hemolytic jaundice associated with mongolism and diabetes mellitus.

# CASE REPORT

A 5-year-old white female was diagnosed as a mongoloid at the age of 7 months and admitted on November 2, 1953, because of frequency of urination and excessive thirst which followed a recent upper respiratory infection.

Physical examination revealed the characteristic findings of mongolism with mental and physical retardation. The sclerae had a definite yellowish tinge. An apical systolic murmur was best heard along the left sternal border and the spleen was palpable.

Questioning the mother as to the duration of the icterus produced an unprompted remark, "She doesn't also have a hemolytic anemia?" Upon further questioning, a positive family history was obtained (figure 1).

The fasting blood sugar was 212-mg. per cent with a 2 plus sugar in the urine. The red blood cell count was 4,890,000 with 13.5 gm. of hemoglobin. The white blood cell count was 6,900 with 39 per cent neutrophiles. The blood smear revealed a moderate spherocytosis. The icterus index was 88

DAVID A. SHER, a 1935 graduate of the University of Minnesota, is associated with the Lenont-Peterson Clinic, Virginia, Minnesota, and is chief of pediatric service, Virginia Municipal Hospital. HAROLD H. JOFFE, a 1940 graduate of the University of Illinois College of Medicine, is pathologist at Virginia Municipal Hospital and associated with the Lenont-Peterson Clinic.

units with a reticulocyte count of 9.1 per cent. The red cell fragility test revealed initial hemolysis at 0.60 per cent and complete at 0.42 per cent. The Coombs' test was negative.

The diabetes, after thirteen days, was finally controlled with 10 units daily of NPH insulin and a diet consisting of 150 gm. of carbohydrate, 60 gm. of protein, and 50 gm. of fat.

### DISCUSSION

This clinical entity has been described under numerous synonyms: congenital hemolytic anemia, familial hemolytic icterus, hereditary spherocytosis, chronic acholuric jaundice, spherocytic jaundice, and spherocytic or globe cell anemia. The disease is transmitted through either parent as a mendelian dominant trait. The positive family tree (figure 1) in this case is most interesting. The paternal grandfather died as the result of the disease. The other afflicted members of the family are living. The exact pathogenesis of the disorder is not well understood, and the spherocytosis may be due either to an inherent defect of erythropoiesis or to the action of a circulating hemolysin. 1,2,3 A hemolytic anemia may result when the survival time of the red blood cells, which is normally one hundred twenty days, becomes so short, less than fifteen to twenty days, that the bone marrow is unable to furnish adequate replacements.4,2,5,6 The role of the spleen, although not clearly understood, is demonstrated by the clinical cure which follows its removal in most cases.

The clinical manifestations usually appear before adolescence but may appear at any age or may never become evident. The first sign or symptom may be a hemolytic crisis.<sup>7,1</sup> This clinical entity may assume one of three forms: <sup>3,16,18</sup> <sup>1,8,9</sup>

1. Latent, which is characterized by no symptoms, anemia, or jaundice and only slight to moderate

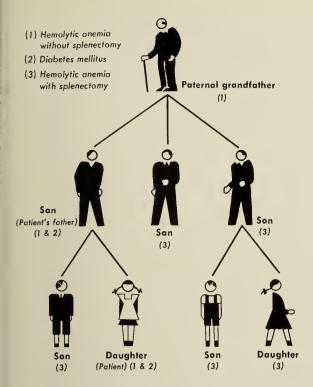


Fig. 1. Positive family history.

spherocytosis. The first indication of the disorder may be an acute hemolytic crisis and thus is often confused with the acquired type of hemolytic anemia.

2. Chronic, which is characterized by generalized weakness, easy fatigue, jaundice, anemia, spherocytosis, reticulocytosis, increased fragility of the erythrocytes, splenomegaly, leg ulcers, rarefactions in the flat bones as well as changes in the calvarium, and a variety of developmental anomalies. The symptoms may be referable to the biliary tract because of the formation of gallstones due to the bilirubinemia.

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- 3. Acute, which is characterized by a hemolytic crisis with fever, pallor, pronounced weakness, shock, nausea, vomiting, and abdominal pain. The precipitating cause is obscure, but the appearance of a hemolytic crisis in several members of a family within a few days points to an intrinsic factor, probably an intercurrent infection.1
- The leukocyte count may be slightly elevated and a leukopenia may be present at the beginning of a hemolytic crisis. The bone marrow is hyperplastic. The spleen is enlarged. The splenic pulp filled with erythrocytes, while the sinuses are relatively empty, is pathognomonic of the disease. 1,8 A positive Coombs' test has been used to differentiate the acquired from the congenital type. 2,10,11,12
- The diagnosis is relatively easy with a familial history and the characteristic clinical and hematologic findings. Cases have been reported in which the erythrocytes were macrocytic; the red cells showed no increased fragility and the blood picture was that of an aplastic anemia. 13,14,15,16 Any child with an anemia, jaundice, or history of jaundice with normal colored stools should be suspected of having a familial hemolytic anemia until proved otherwise.
- Splenectomy is the treatment of choice and care should be exercised to remove accessory spleens. A cure can be expected in every correctly diagnosed case of the congenital type but in only 60 per cent of the acquired type. 10 The results of splenectomy are better in those cases with microspherocytic erythrocytes and increased fragility than in those in which microspherocytosis is absent. <sup>15</sup> A leukocytosis and thrombocytosis may be present for some time after splenectomy and the latter may predispose to thrombotic phenomena. A lower degree of spherocytosis, increased fragility of the erythrocytes, and reticulocytosis are usually permanent.1

#### SUMMARY

- 1. We have reported a case of familial hemolytic jaundice in a child with mongolism and diabetes mellitus with an interesting positive family history.
  - 2. A brief review of the subject is presented.
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## Lancet Editorial

# Public Health — An Expenditure or Investment?

PUBLIC HEALTH needs no apology. The saving of human life, the prolongation of useful life, and the general improvement of well-being which have resulted during the past century from the public health movement stand out as monumental achievements. As long as we have a sense of the value of human life, we never need to apologize for a program that makes life longer, richer, and more worth living.

However, these results have not been achieved without some cost to the community. Although some people may receive services without direct charge, someone must pay for whatever public health services are rendered to the community. In public health, this someone is the taxpayer. As the paver, he has logically a right to ask from time to time for an accounting of his funds, to inquire whether or not they are being spent wisely, and to know what he is receiving from this expenditure. Although the taxpayer is not devoid of that element of humane concern for human life, he may well wonder whether the money he is paying for public health will eliminate or reduce other charges that would be required to care for the human wreckage we are seeking to prevent. In other words, is the money that he spends for public health an expenditure or an investment?

Although we would like to believe that public health arose from a highly altruistic desire to improve the physical well-being of the people, historic accuracy compels us to note that the modern public health movement, which had its beginning in England a century ago, had an essentially mercenary foundation. The pioneer figure, Edwin Chadwick, was a staunch defender of human rights, but the driving force was his firm conviction that society was carrying an unnecessarily heavy financial relief load, which could be substantially reduced if a suitable preventive program were instituted. He believed that a comparatively small expenditure for public health would yield a material saving in the need for public charity, and that the community would then receive a substantial financial return from its investments in public health.

In the development of public health programs we have never felt that we had to apologize for the expenses required, for we have set human life above mere monetary value. We have taken legitimate pride in our accomplishment in saving life and in lengthening the expectancy of life at birth.

My attention was first directed to this question a few years ago by the costly and tragic experience of a small town that paid dearly for a penny-wise, pound-foolish economy. The proposed budget included an item of \$150 for diphtheria immunization, but at the town meeting this item was eliminated as an unnecessary expenditure. The town had never appropriated money for this purpose before, so why increase the taxes by including an apparently needless expense? During the succeeding two years, however, this same town that couldn't afford \$150 for prevention paid out over \$1,500 for care and treatment of diphtheria cases and no sum of money could bring back to life the two children who died of the disease. The town learned its lesson in a costly and bitter fashion but in future years provided for a continuing immunization program. This is not an isolated instance.

The provision of treatment for syphilitic patients not only prevents further spread of the infection but also reduces the need for larger expenditures to care for patients who are incapacitated through mental or cardiac involvement. The discovery and treatment of tuberculosis in its early stages is cheaper before extensive spread has occurred than is the ostrich policy of waiting until the patient is in serious need of hospitalization. At that time little more can be done than to give the patient a decent place to die. The community is then left with a long series of heavy expenses to care for those who are left destitute.

Public health costs money. That fact cannot and should not be denied. As a community we have no way of paying other than through the tax levy, so, whenever the health program is broadened, we must anticipate an increase in the tax levy. If such expenditures can eliminate other costs that we must bear, this increase in the tax levy is not to be thought of as an added expense. Instead, it is an investment which yields a substantial return through reduced expenditures for conditions which are prevented. A few cents invested in public health may save many dollars in public relief. Public health is truly an investment, not an expenditure.

GAYLORD W. ANDERSON, M.D.

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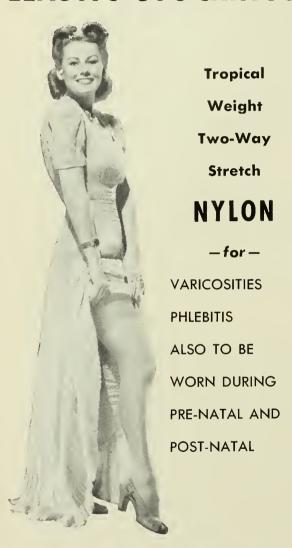
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#### A.C.H.A. News

Dr. Louis Barbato, director of health services at the University of Denver, is chairman of the Committee on Local Arrangements for the 1955 meeting of the A.C.H.A. at the Broadmoor Hotel, Colorado Springs, April 28 to 30.

Dr. Barbato will be pleased to receive suggestions from members of the Association concerning program items for this meeting. Communications should be sent di-

rectly to him in Denver.

DR. Graham Grant, senior medical officer and director, University of Wales Health Service, Cardiff, Wales, was a visitor and guest of the A.C.H.A. at the recent Fourth National Conference on Health in Colleges in New York City. Dr. Grant spent the next month visiting the health services at the University of Chicago, University of Minnesota, University of Michigan, Michigan State College, Wayne University, Massachusetts Institute of Technology, Columbia University, and New York University. Dr. Grant was in this country on scholarship funds provided by a local medical association in Wales. He sailed from New York on June 16.

The following is a condensed report of the treasurer of the ACHA, approved by the Council at its meeting in New York on May 7:

Proceedings 1,444.86
Journal-Lancet Subscriptions 496.00
Section Refunds 174.00
1953 Annual Meeting 2,043.00
Miscellaneous Expenses 179.20

Balance on hand as of April 27, 1954 \$4,541.39 This amount includes \$246.51 held for the account of the New York Section. Expenses of the New York meeting have not yet been totalled and will reduce the balance reported above.

EDITH M. LINDSAY, Treasurer

\$4,732.45

The following schools were approved for membership at the business meeting of the Association on May 7 in New York City:

ew 107K City:
Associated Colleges, Claremont, Calif.
Bennett College, Greensboro, N. C.

California Institute of Technology, Pasadena, Calif.

Central State College, Wilberforce, Ohio

Colby College, Waterville, Maine

University of Delaware, Newark, Delaware

Ferris Institute, Big Rapids, Mich. Gettysburg College, Gettysburg, Pa.

Macalester College, St. Paul, Minn.

University of Miami, Coral Gables, Fla. Monmouth College, Monmouth, Ill.

University of North Dakota, Grand Forks, No. Dak.

Rockford College, Rockford, Ill. San Diego State College, San Diego, Calif.

Diego state Conege, san Diego, Cani.

Southwest Texas State College, San Marcos, Texas St. John College, Cleveland, Ohio Whittier College, Whittier, Calif.

We welcome these schools into our membership and hope that they will take an active and productive part in the affairs of the Association.

ROBERT H. VADHEIM, M.D. is the newly-appointed Director of the Student Health Department at the University of Florida, Gainesville, Fla.

IRVIN W. SANDER, M.D., Secretary-Treasurer

THERE ARE OPENINGS for two staff physicians, one at Michigan State College, East Lansing, and the other at the University of New Mexico, Albuquerque.

## ASEPTIC MENINGITIS AND COXSACKIE VIRUSES (Continued from page 304)

taneous dissemination of several viruses will easily lead to false conclusions. Furthermore, obviously very little signficance can be attached to notifications of nonparalytic poliomyelitis. The typical paralytic cases should be reported separately and only such cases considered in statistical studies—until routine virologic service is generally available and an etiologic diagnosis can be established in every case.

We acknowledge with pleasure the aid rendered and the great interest with which our studies were followed. Our thanks are due to Drs. J. Ström and J. Lindahl, Stockholm; H. Hellsten, Malmö; O. Gabinus, Jönköping; and B. Jönsson, Eskilstuna, as well as to their staffs.

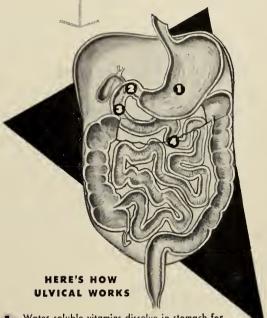
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The Surgery of Infancy and Childhood; Its Principles and Techniques, by Robert E. Gross, M. D., and William E. Ladd, 1953. W. B. Saunders Co., Philadelphia: 1,488 illustrations on 567 figures. Drawings by Etta Piotti. 1,000 pages. \$16.00.

Certainly any surgeon who wants often to operate on children for any of the many peculiar deformities or diseases to which they are subject should own this book. It is a magnificent piece of work based on an enormous experience in this particular field. Certainly it should be a classic for years to come. It is well written and beautifully illustrated. It would make fascinating reading for any physician who is interested in congenital malformations.

To give some idea of the experience that Dr. Gross has had in this field, on page 83 he presents a group picture of 9 infants who at one time were in the hospital for treatment of an esophageal atresia.

This book represents a tremendous amount of labor, and certainly Dr. Gross should receive the con-



gratulations of the whole medical profession.

WALTER C. ALVAREZ, M.D.

Histology, edited by Roy O. Greep, Ph.D., 1954. Philadelphia: The Blakiston Co. \$15.00.

This volume marks a milestone in textbooks of histology in that it incorporates a great deal of the newer knowledge of the finer structure of the human body derived from electron microscope and histochemical studies. The reader is given some insight into the chemistry of staining, which is an absolute essential to an understanding of the emerging science of chemical histology.

These newer elements are introduced without sacrifice of the classical knowledge, which must sooner or later be integrated into the biochemical and physiologic aspects of microscopic structures.

Written by present and former members of the staff of the department of anatomy of the Harvard Medical School, it has a unity of viewpoint not easily obtainable in a work contributed to by 13 authors. The large number of contributors allows the pooling of a great deal of personal knowledge of the various segments of the subject, giving the book more of the character of a collection of scholarly reviews than is possible when a single author covers an entire subject as broad as mammalian histology. It should not be inferred, however, that the book is uniformly exhaustive. Studies from other laboratories are sometimes slighted, as, for example, the work of Schour in dental histology. Considering its many merits, the book is to be recommended to physicians desiring reorientation in histology.

MAURICE B. VISSCHER, M.D.



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#### North Dakota

THE WILLISTON CLINIC will occupy the entire second floor of the new Rolfstad building, which is now under construction. The move will double the present floor space and allow for the addition of increased facilities. The new building is expected to be ready for occupancy in September or October.

Dr. E. A. Haunz, of Grand Forks, has been appointed governor of the American Diabetes Association for North Dakota and has been reappointed to the national committee on detection and education. He will supervise state-wide activities in furthering education in diabetes and its control. Dr. Haunz is active on numerous committees and is a member of the Grand Forks Clinic staff.

Dr. R. O. Saxvik, on request from the board of administration of the State Mental Hospital at Jamestown, has been granted a second year's leave of absence to serve as director of the hospital. The Council commended him for an "outstanding job" in accomplishments he brought about at the hospital since he started there in July 1953.

Dr. K. M. Murray was honored recently in Scranton for forty-five years of work in the community. He was county health officer for many years in addition to his medical duties.

Dr. H. M. BERG, who is associated with the Quain & Ramstad Clinic at Bismarck, was named a fellow in the

American College of Chest Physicians at their national convention in San Francisco. He is director of the radiology section at the clinic.

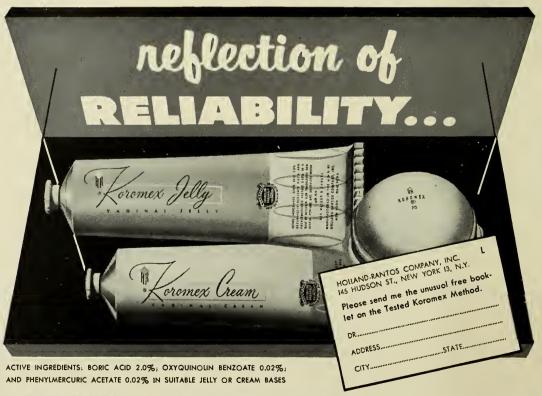
Dr. Robert Burns, recently from Winnipeg, has come to Carrington to take over the medical practice of Dr. A. G. Gray, who is soon to leave for British Columbia.

#### Minnesota

THE DAMON RUNYON MEMORIAL Fund has awarded \$15,000 to the University of Minnesota for the purpose of allowing Dr. Owen Wangensteen, chief of the university's surgery department, to continue his cancer research project. Dr. Wangensteen's "second-look" operation is for patients with gastric, colic or rectal cancer.

THE RAMSEY county welfare board has recommended construction of a new Ancker Hospital plant at a cost of \$8,250,000. The cost would be divided between Ramsey county and the city of St. Paul at approximately \$6,000,000, and the remaining sum would come in federal funds. Approval by both St. Paul city council and the county board of commissioners is necessary. Features of the new hospital are a two-wing unit on the southwest end of the present property, a new nurses home, and a new building to house residents and interns.

Dr. Thomas Peppard, staff member of the Asbury Methodist Hospital, was presented with a bronze plaque (Continued on page 326)



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GROUND FLOOR 93 East Sixth Street St. Paul 1, Minnesota (Continued from page 324)

at a staff picnic in recognition of his many years of service to the hospital. Born in Minneapolis, Dr. Peppard has been a member of the hospital staff since its reorganization in 1924 and served as staff president for two years. He has been a member of the Minneapolis General Hospital staff and medical faculty of the University of Minnesota since 1927.

Two UNITED STATES Public Health Service fellowships were awarded to residents in surgery at Ancker Hospital. Dr. Joseph L. Sprafka, Jr., and Dr. Truman J. Newberry were named "national heart trainee" and "national cancer trainee" respectively.

Dr. J. D. Shronts, medical director of General Mills, Inc., has been elected the new president of the Minnesota Academy of Occupational Medicine and Surgery. This group was formed to promote sound medical practices in industry.

Dr. R. D. Nichols, a graduate of Western Reserve University, has joined Dr. C. G. Wingquist in practice at Crosby. Dr. Nichols, a National Board Diplomate, comes to Crosby from Mercy Hospital, Toledo.

#### South Dakota

Dr. V. Ronald Nelson and his assistant, Gary Giedd, both of the physics and mathematics department at Augustana College, have completed work on a "heart shocker," a machine designed to deliver intense electric

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shocks to restore heart operation when the heart ceases to function properly during surgery. With no working model to guide them, they worked from diagrams in medical journals, using ingenuity and resourcefulness in securing parts from various electrical shops or making substitutions for those they couldn't obtain. Dr. Nelson has also added an attachment which permits the heart to be stimulated without opening the chest.

Dr. E. M. Stansbury, active in medical practice in Vermillion and elsewhere for forty-five years, has retired from general practice. For the past fifteen years, Dr. Stansbury was a member of the teaching staff of the medical school at the University of South Dakota.

Dr. John J. Wooster has been appointed chief of acute intensive treatment at Ft. Meade Veterans Hospital. Formerly, Dr. Wooster was with the Veterans Hospital at Hines, Illinois.

#### Deaths...

Dr. Melvin Henderson, 71, founder of the orthopedic surgery section at the Mayo Clinic, died June 17. He was president of the American Academy of Orthopedic Surgeons for thirteen years, retiring in 1948.

Dr. Arnold P. Gruenhagen, 59, well-known St. Paul surgeon, died July 6. Dr. Gruenhagen was a staff member of St. Luke's, Miller, and Ancker hospitals, and a member of the faculty at the University of Minnesota for fifteen years.

Dr. Merritt W. Wheeler, 67, former St. Paul physician, died June 21. Dr. Wheeler retired in 1946, having practiced in St. Paul for twenty-eight years.

Dr. Charles G. Forrest, a physician in Clearbrook, Minnesota and active in community affairs for forty years, died June 17 after an illness of several months.

Dr. H. I. King, prominent Aberdeen, South Dakota physician, died June 24. A graduate of Northwestern University Medical School, Dr. King was on the staff of St. Luke's Hospital, Aberdeen, until his retirement in 1951.

Dr. Henry Hornby, 84, a Sioux Falls, South Dakota physician, died June 18 after an extended illness.



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# Observations on Insulin Requirement in Kimmelstiel-Wilson Disease\*

ROBERT M. FAWCETT, M.D.

Devils Lake, North Dakota

Jewhose insulin requirements over a period of several years exhibited such a wide range that his case serves to illustrate two equally poorly understood phenomena: (1) insulin resistance, and (2) apparent amelioration of diabetes in the presence of Kimmelstiel-Wilson disease.

In 1936 Kimmelstiel and Wilson¹ first reported a series of cases showing conspicuous correlation between the clinical syndrome of diabetes, edema, albuminuria, and hypertension on the one hand and a particular type of intercapillary glomerulosclerosis on pathologic section of the

kidney.

Since that time, opinion has differed somewhat concerning the specificity of the lesion inasmuch as intercapillary glomerulosclerosis, particularly of the diffuse type, is at times seen in glomerulonephritis. While this is true, Kimmelstiel,<sup>2</sup> Bell,<sup>3</sup> and others have pointed out that the classical nodular type of the intercapillary hyaline mass in the glomeruli is seen almost exclusively in diabetes. In this form, it is found in approximately 17 per cent of diabetics and has been produced in the experimental animal, made diabetic by administration of anterior pituitary extract.<sup>4</sup>

ROBERT M. FAWCETT, a 1940 graduate of the University of Pennsylvania School of Medicine, is affiliated with the Lake Region Clinic, Devils Lake, North Dakota.

#### CASE HISTORY (TABLE 1)

Our patient, a businessman in a nearby town, was 40 years of age when first seen by one of our group in 1946. His diabetes was under the care of another physician and he came to us for an unrelated matter; only a urine specimen was obtained and it was negative for albumin and sugar. At that time, he had had knowledge of

his diabetes for only two years.

Until May 1948, the patient managed moderately well with fair control of his diabetes on 50 to 70 units of protamine insulin a day. In May of 1948, for no apparent reason, his diabetes became much more severe with increased thirst, weight loss, 4 plus urine sugar, and fasting blood sugar of 351 in spite of steadily increasing his insulin dosage. At that time, he first showed blood pressure elevation, increased retention of urea nitrogen, and moderate anemia. Even with his diabetes thus out of control, he showed no acetone or diacetic acid in his urine.

In June 1948, despite 180 to 200 units of insulin each day, most of his urines were 3 plus; his basal metabolism rate, chest roentgenogram, and other studies in search for the cause of this increased insulin requirement were all negative. In July and August of 1948, he was seen at the Mayo Clinic. On their hospital service he was kept relatively free of glycosuria on 180 to 200

<sup>°</sup>Presented at the regional meeting of the American College of physicians at Fargo, North Dakota, September 12, 1953.

units of insulin a day. No cause for his apparent insensitivity to insulin was found, and the presumptive diagnosis of intercapillary glomerulo-selerosis was made.

Between September 1948 and March 1949, his insulin requirement fell steadily and by April 1949, his blood sugar and urine sugar were normal on 18 units of insulin each day. In August, he was down to 6 units of protamine insulin a day. His anemia was becoming a little more severe and completely unresponsive to any medication. Bone marrow smears revealed only reduced evidence of crythropoiesis, such as seen in the anemia of chronic renal insufficiency. He was anxious to go off insulin completely, but in view of his previous history of insulin insensitivity he was maintained on 6 units of protamine insulin each day.

He did not return from Angust 1950 until March 1952. At that time his insulin was stopped and his blood sugar remained normal. In April 1953, because of slight elevation of his blood sugar, he was returned to 6 units of protamine insulin a day, when evidence of increasing renal insufficiency and a blood pressure of 170/90 were recorded.

In an attempt to exclude other causes for amelioration of the diabetic state, a basal metabolic rate determination was done and found normal. A normal bromsulphalein liver function test served to exclude significant liver disease. Clinical findings did not support a diagnosis of adrenal cortical insufficiency or suggest a destructive lesion of the anterior pituitary gland. Except for easy fatigue and minimal ankle edema, he has felt quite well, has continued in the

TABLE 1 CASE HISTORY

Date	Blood sugar	Insulin dosage	Urinalysis	Urea nitrogen	Miscellany
10-30-46		?	Alb0 Sug0		
11-22-47	208	P 50	Alb1 Sug4		B.P. 138/74
1-14-48	121	P 60 R 10	Alb1 SugTr.		Ankle edema
5-20-48	351	P 60 R 40	Alb.–1 Sug.–4 Acet.–Tr. Diac.–0	42	Hgb. 70% B.P. 160/90
5-28-48		P 30 — R 60 R 40 R 60	Alb1 Sug4		Thirst, weight loss
6-23-48		P 40 — R 80 R 30 R 40	Alb.–3 Sug.–3 Acetone–0	35	Hgb. 65% Red blood count 3.34 cc.
July 1948	Mayo Clinic	P 40 — R 120 R 20 — 40			
9-10-48		P 30 — R 90	SugTr.	36	No edema
12-14-48	165	P 15 — R 65	Sug0		B.P. 138/86
3-10-49		P 5 — R 15	Sug0		
4-15-49	121	P 6 – R 12	Alb.–4 Sug.–0 Red blood count–1-2		B.P. 158/88 Hgb. 60% Red blood count 2.86 cc.
8-24-49		P 6	Sug0		Hgb. 58% Red blood count 2.86 cc. 2 transfusions
10-17-49		P 6	Alb.–4 Sug.–0 Red blood count–1-2		Hgb. 57% Red blood count 2.35 cc.
8-7-50		P 6	Alb.–4 Sug.–0 Red blood count–1-2 Occ. gran. cast		B.P. 140/80 No edema
3-26-52	112	P 6	Alb.–4 Sug.–0		Hgb. 65% Red blood count 2.9 cc.
4-14-52	121	0			
10-9-52	115	0	Alb.–4 Sug.–0 Occ. gran. cast		B.P. 150/100
4-13-53	170	0	Sug0	64	B.P. 170/90 Edema. Hgb. 52%
5-27-53	121	P 6	Alb.–4 Sug.–0 Acetone–0 10–12 gran. casts		B.P. 170/100. Hgb. 46% Red blood count 2.4 cc.

active management of a successful small town business, and has found time and energy for frequent fishing trips.

#### INSULIN RESISTANCE

Insulin resistance has been arbitrarily defined as a state requiring 200 or more units of insulin per day for more than forty-eight hours in a nonacidotic patient. Davidson and Eddleman,<sup>5</sup> in a recent article, have tabulated those conditions causing temporary increase in insulin requirement (table 2). Faulty absorption of insulin occurs in lipodystrophy, shock, or congestive heart failure; the hypermetabolism of hyperthyroidism results in increased insulin requirement. In diabetic acidosis, both an actual insulin deficiency and an overly active adrenal cortex occur as a result of the alarm reaction. The alarm reaction of Selve is thought to be the mechanism of increased insulin need also during surgery, trauma, or acute infections. Cushing's syndrome, with its increased production of steroid hormones and pheochromocytoma, thought to produce increased mobilization of hepatic glycogen, are other causes of increased insulin requirement.

There is yet another group of true insulin resistance in which none of the above factors can be demonstrated. Davidson and Eddleman<sup>5</sup> recently reviewed 50 such cases collected from the literature. These cases presented no significant incidence of associated disease or patho-

logic process.

These patients fall within a wide age group; most respond if given enough insulin, 1 patient received 5,800 units in a day – another averaged 850 units per day for a four-year period. The duration of resistance to insulin in most cases was from one month to one year and then disappeared, often rather abruptly, for no apparent reason.

Insulin is a protein molecule, possessing antigenic properties, which can give rise to two types of antibodies: (1) reagin, which is responsible for the manifestations of allergy to insulin, that is, local redness, itching, and generalized urticaria (incidentally, some such reactions have been shown to be due to impurities in the insulin), and (2) insulin neutralizing antibodies, which neutralize the hypoglycemic effects of insulin.

In Davidson and Eddleman's review of the literature, they found in the 50 patients with true insulin resistance that of 26 studied for insulin resisting antibodies, only 8 were found; 17 of the 50 showed some evidence of allergy to insulin; of these 17, insulin resisting antibodies were sought in 10 and found in only 3.

#### TABLE 2

#### CONDITIONS CAUSING TEMPORARY INCREASE IN INSULIN REQUIREMENT

(Davidson-Eddleman)

1. Poor absorption from subcutaneous tissues

Insulin lipodystrophy (lipohypertrophy and lipoatrophy with fibrosis)

Shock

Congestive heart failure

2. Hypermetabolism

Hyperthyroidism 3. Insulin deficiency plus hyperfunction of adrenal cortex (alarm reaction of Selve)

Diabetic acidosis

4. Hyperfunction of adrenal cortex

Surgieal procedures

Trauma

Acute infectious processes

Pituitary basophilism

Careinoma of adrenal cortex

5. Increased mobilization of hepatic glycogen

Pheochromocytoma

The conclusions reached from this complete review of the literature were: (1) That no fundamental relationship between insulin allergy and resistance could be found. (2) Insulin resisting antibodies are the probable cause of insulin resistance in some patients and this number may be increased with more refined technics for demonstrating the antibodies. (3) The cause of many cases of insulin resistance remains unknown. Other possibilities being explored, but not yet proved, by workers in this field are neutralization of insulin by fixed tissue antibodies.<sup>6</sup> and inactivation of insulin by substances naturally occurring in the body such as trypsin<sup>7</sup> and insulinase.8 The latter is the name given an antiinsulin substance isolated in aqueous extracts of liver, kidney, and muscle, which destroys insulin on incubation.

#### AMELIORATION OF DIABETES IN KIMMELSTIEL-WILSON DISEASE

I should like to pass now from insulin resistance to the other phenomenon illustrated by our case report: namely, apparent amelioration of diabetes in the presence of Kimmelstiel-Wilson disease. As early as 1886, a man by the name of Stokvis9 referred to instances of modification of diabetes in association with albuminuric nephritis. In 1905, a medical writer by the name of Von Noorden<sup>9</sup> emphasized the fact that clinicians occasionally observed the disappearance of diabetic glycosuria with the advent of renal insufficiency.

In spite of the long period of time in which this observation was made, very little has appeared in the literature on this subject. Mc-Manus<sup>10</sup> described two such cases and 3 of the 8 patients in Kimmelstiel's and Wilson's original

report on intercapillary glomeruloselerosis¹ had a history of diabetes but without glycosuria at the time of the report. Spraguc,¹¹ in a personal communication, tells of 1 patient with an original insulin requirement of 50 units each day who, in the preterminal period, not only discontinued insulin altogether but actually had severe hypoglycemia in the last two weeks of his life.

A group from Johns Hopkins, Zubrod, Eversole, and Dana,<sup>9</sup> have become interested in this problem and have conducted a clinicopathologic study of diabetes with and without the Kimmelstiel-Wilson lesion in the kidney. Their method of study divided their cases into 3 pathologic categories, as determined by a pathologist who had no knowledge of the clinical history. Thus, 57 of their cases were found to have the typical hyaline mass in the glomerulus, as described by Kimmelstiel and Wilson, 48 to have other renal lesions, and 85 to show no renal lesions. Their pathologic study included a review of sections of liver, thyroid, adrenal, and anterior pituitary. No consistent changes were found.

In evaluating their clinical data, they chose a basal period, selected from the middle third of the patient's diabetic life and before infection, gangrene, or other complications were apparent, and a preterminal period. They readily admit that criteria for improvement in diabetes are difficult, in view of such variables as diet, weight loss, and infection. Their criterion for improvement or lack of improvement in the individual's diabetes was on the basis of insulin requirement in the basal and the preterminal periods. Inasmuch as all diabetics coming to autopsy were included, the variable factors would be comparable for all 3 groups.

TABLE 3

SEVERITY OF DIABETES IN 58 PATIENTS WITH KIMMELSTIEL-WILSON LESIONS (1925-1950) and 133 PATIENTS
WITH DIABETES MELLITUS (1938-1950)

(Zubrod et al.)

47

45(53%)

17(20%)

WithWithWithKimmelstielother norenal Wilson renallesions lesions lesions Number of patients 57 48 85 Color (white) 29 33 44 (Negro) 28 15 41 Sex (male) 16 15 40 (female) 41 33 45 Average age at death 57 60 50 Insulin requirement (Average number of units per day) Basal 18 15

15

2(4%)

52

20(42%)

8(17%)

The fact is noted that during the midphase of their diabetic life, the basal period, the severity of diabetes in terms of insulin requirement was fully as great in the group with Kimmelstiel-Wilson lesions as in the other 2 groups. Yet in the preterminal period, the Kimmelstiel-Wilson group's average daily insulin requirement had fallen to 15 while in the group with other renal lesions and the group with no renal disease, the average daily requirement had risen to 50 and 47 respectively. The history of acidosis was 4 per cent in the Kimmelstiel-Wilson group as compared with 42 per cent and 53 per cent in the 2 control groups. Death in diabetic coma did not occur in any of the Kimmelstiel-Wilson group but did occur in 17 per cent of the group with other renal lesions and in 20 per cent of the group with no renal disease. These figures tend to show that at the end of life, the preterminal period, the diabetes of the Kimmelstiel-Wilson group was significantly less severe than in the controls. Not only was the insulin requirement lower

Table 3 shows briefly some of their findings.

Not only was the insulin requirement lower preterminally, but the fasting blood sugar was consistently lower with 46 per cent of the Kimmelstiel-Wilson group having a fasting blood sugar preterminally of below 120. Whereas the Kimmelstiel-Wilson group had only 2 cases showing acidosis, each of them with only a single episode, the patients in control groups developed acidosis repeatedly. The absence of acidosis was apparent throughout the entire diabetic life of the Kimmelstiel-Wilson group, while the trend toward amelioration of the diabetes itself appeared only after evidence of renal involvement was apparent for some time.

The cause of this apparent amelioration and absence of acidosis is not known. These same authors from Johns Hopkins are in the process of conducting a more extensive clinical study of this group of patients. A preliminary paper<sup>12</sup> on this subject reports a very high incidence of aneurysms of retinal capillaries in association with the glomerular nodules. In those patients with this combination, no instance of acidosis occurred even in those patients deliberately withdrawn from insulin and allowed to develop hyperglycemia. Careful study of the sections of pituitary to determine if similar aneurysmal changes occurred in the capillaries, which might account for the apparent amelioration of the diabetes, was negative. They feel that patients with capillary aneurysms of the retina, glomerular nodules, and hyperglycemia without acidosis have a specific metabolic defect, which differs from

(Continued on page 389)

Preterminal

History of acidosis

Death in coma

# Complications of Cortisone and ACTH Therapy\*

LESTER E. WOLD, M.D. Fargo, North Dakota

CURRENT literature contains much regarding contraindications for cortisone and ACTH therapy. Complications have been reported which affect every system in the body. Generally, complications are believed to be more apt to occur in the older age group. Boland¹ feels that females have a greater tendency to develop compileations than do males. Boland and Ward and associates<sup>2</sup> have demonstrated that with a daily dose of 75 mg. or more of cortisone, a sharp increase in complications is encountered, especially after prolonged therapy. The most common cardiovascular complications<sup>3</sup> are hypertension, fluid retention, cardiac failure, and myocardial infarction. Central nervous system complications are perhaps most frequently encountered. Practically all of the patients exhibit a euphoria, and almost all note insomnia during the first week of therapy. Epileptiform fits are frequent; headaches and psychiatric disturbances are not uncommon. Hematologic complications include neutropenia, eosinopenia, and lymphopenia. Endocrine disturbances after prolonged ACTH or cortisone therapy include Cushing's syndrome with acne, obesity, moonface, hypertension, abnormal glucose tolerance, and osteoporosis. Diabetes has been reported. Genitourinary complications include an increase in the gastric acidity, frequent flare-up of duodenal ulcers, perforations of peptic ulcers and diverticula of the colon, and gastrointestinal hemorrhages. Intercurrent infections are adversely affected by prevention of localization. Spread of inactive and well circumscribed pulmonary tuberculosis has been frequently reported, the dangerous feature being the reduction of fever and the symptoms of toxemia. The genitourinary system perhaps is freest from complications. No serious renal complications have occurred to our knowledge.

Salassa and associates<sup>4</sup> in a recent article in the Journal of the American Medical Associa-

LESTER E. WOLD, a 1938 graduate of Rush Medical College, is on the staff of St. Luke's Hospital, Fargo, and is affiliated with the Fargo Clinic.

tion pointed out the hazard of fulminating postoperative addisonian crisis in patients who have had previous cortisone or ACTH therapy. Postmortem studies show a relative atrophy of the adrenals after even short-term therapy. Fatal addisonian crisis has been encountered after even minor surgery, such as bunionectomy.

Any internist who uses cortisone or ACTH encounters complications. Those who are most familiar with the use of these preparations are the slowest to prescribe them. Certainly, there is no place in medicine for the casual use of these drugs. We wish to report two patients with fatal complications after the use of cortisone therapy.

Case H. P., a 51-year-old male, was referred by his local physician for an evaluation of his cardiac status. He had had rheumatic fever at the age of 4, at which time he was confined to bed for about one year. From that time until the onset of his present illness, about three years prior to admission, the patient stated he had enjoyed good health. He was able to do his farming without difficulty. In 1949, he first consulted his local physician because of cough, palpitation, dyspnea, and hemoptysis. At that time his hemoglobin was found to be "58 per cent of normal." The patient stated that after the correction of his anemia, the symptoms subsided. However, he volunteered that since that time he had never felt quite as strong as he had, and that he tired more easily. On December 14, 1952, the patient went rabbit hunting. The next day he was unusually fatigued and said he felt as though he had the flu. He was given penicillin and Terramycin for a "tonsillitis" one week later. He began to have nocturnal dyspnca, and was given more penicillin and digitalized. The possibility of acute rheumatic fever was entertained and cortisone therapy was initiated in February. Vague precordial pain accompanied by sweating and dyspnea became quite bothersome. He again had hemoptysis. The patient had two episodes of syncope while trying to get out of bed. On the day of admission, March 23, 1953, he began to complain of a frontal headache.

Physical examination revealed an acutely ill 52-yearold white male. The mucous membranes were pale. No petechiae were noted. There was dullness in either base with rales more pronounced on the right. The heart was enlarged to the left. Fibrillation was noted. A systolic apical murmur was heard. The spleen was not pal-

<sup>&</sup>lt;sup>o</sup>Presented at the regional meeting of the American College of Physcians at Fargo, North Dakota, September, 1953.

pated. Chest roentgenograms revealed the transverse diameter of the heart to be within normal limits and the pulmonary artery segments were prominent. There was a diffuse reticulative infiltration throughout both lung fields, most pronounced in the hilar areas and extending to the bases. The hemoglobin measured 9.6 gm., with 9,150 white cells and a sedimentation rate of 117. The Mazzini test for syphilis was negative. Blood urea nitrogen measured  $20.3~\mathrm{mg}$ . The following day the patient was fluoroseoped. Mitral configuration with enlargement of the left auricle posteriorly was graded at II on the basis of IV. Low grade eongestion of the intrapulmonary vessels was noted in addition to a diffuse pulmonary infiltration characteristic of interstitial pneumonitis. This was especially prominent in the right middle and lower lobes. The pulmonary changes were felt to be consistent with but not diagnostie of rheumatic pneumonitis. The urine revealed a 1+ albumin with 60 to 80 red eells and 15 to 20 white eells. Repeated blood eultures were sterile. ACTH was initiated. The patient continued to have a febrile course with temperature elevations to 103; the right frontal headache beeame progressively more prominent; weakness became severe; nuchal rigidity developed; the patient became unresponsive and developed a left hemiparesis. He deteriorated steadily, developed Cheyne-Stokes respiration and expired April 7, two weeks

Postmortem examination revealed old fibroeaseous pulmonary tubereulosis with miliary tubereulosis involving all organs, including lungs, spleen, kidneys, liver, and brain. Vegetations were observed on the mitral valve. These were of recent origin, ulcerating and superimposed on an old valvulitis (mitral stenosis). There was a tubereulous meningitis and a tubereulous basalar abscess. We felt that the cortisone and ACTH therapy this patient received before we saw him and during the time he was under our management was directly related to the breakdown of an old pulmonary tuberculosis with resulting fatal miliary spread.

Case A. E., a 33-year-old housewife, whom we first saw in September 1949, complained of joint pain. A tentative diagnosis of rheumatoid arthritis was made. In spite of therapy with cortisone and artisone during that summer and fall, the elinical picture of scleroderma developed. Associated with the scleroderma was a pronounced thromboeytopenic purpura and anemia. She was referred elsewhere where a splenectomy was done and cortisone therapy continued. During the next two years she had repeated gastrointestinal hemorrhage for which again she was referred elsewhere and an exploratory procedure earried out in February 1952. No bleed-

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ing lesion could be discovered. A cholecystectomy was performed. In February 1953, the patient fell in the bathroom and fractured her left hip. Trauma was minimal. The fall may have occurred after the fracture. At this time she was taking 25 mg, of cortisone a day. Her hemoglobin was found to be 11 gm. She stated she had had no epistaxis or gastrointestinal bleeding for the past year. The patient was prepared for surgery and oral cortisone continued, supplemented by 50 mg. of cortisone intramuscularly each day for one week. She was given % gr. of morphine and 1/200 gr. of atropine as a premedication and taken to surgery March 8 for internal fixation of the fracture. The anesthetic induction by Sodium Pentothal was performed and the anesthetic was changed to ether and oxygen. The patient was transferred from the cart to the orthopedie table after which the pulse suddenly became unobtainable. Intereardiae Adrenalin was administered without effect. No surgery was undertaken.

Postmortem examination revealed that the pituitary gland was enlarged to nearly twice normal size and eontained an unusual amount of fibrous tissue associated with extensive arteritis characterized by thickening of the walls of small vessels, sclerosis, and diminution of the lumen. Similar vascular changes were noted elsewhere, particularly the lung. The adrenals appeared atrophie, particularly the right. Careful examination of the heart revealed a thickened, opaque pericardium with 50 ce. perieardial fluid and patchy fibrosis of the left

ventriele and septum.

We have already pointed out the hazards of surgical procedures in any patient who has had prior cortisone or ACTH therapy. While we feel that the cardiac arrest in this case was in no way associated with a fulminating addisonian crisis, we do feel that possibly it was in some way related to long preanesthetic cortisone therapy, and we can only speculate as to the mechanism which produced the fatal arrest. It is interesting to note that while taking much larger doses of cortisone one and two years prior to her death, she tolerated two major surgical procedures.

#### CONCLUSIONS

The complications of cortisone and ACTH therapy have been discussed. Two patients with fatal complications have been presented.

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## Drug Therapy in Hyertension

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In the past few years, the fact has been established that most cases of hypertension can be treated effectively with properly selected hypotensive drugs. In addition, it has been shown that elevated blood pressures can be lowered and often maintained at normotensive levels. Now it appears also that the progress of the pathologic changes in hypertension actually can be retarded.¹ Furthermore, a sense of well-being usually accompanies the lowered arterial tension under drug therapy.

Although excellent reports from many quarters have appeared in recent literature, I feel justified in recording my experiences with a small group of private patients, particularly in view of the ease with which the practitioner now can treat most of his hypertensive patients successfully by utilizing hypotensive drugs as

the main therapeutic tool.

Obviously, a few unusually recalcitrant cases of hypertension may require special variations of treatment, or may require surgery combined with drug therapy. However, the cases reported here represent a series of unselected hypertensive patients as they presented themselves in everyday practice. The hypertension in many instances was unknown to the patient and incidental to the main complaint. These patients constitute a fair cross section of the usual types of hypertension the practitioner must treat.

The role of psychogenic factors in the etiology and course of hypertension is well recognized. Thus, a hypotensive agent that will tend to control emotional and nervous irritability without causing somnolence offers a real advantage.

In keeping with the basic principle of utilizing the mildest form of therapy which will accomplish the therapeutic aim, my general approach to treatment in the 22 patients in this series was to begin with the alseroxylon fraction of Rauwolfia serpentina, Rauwiloid. Two tablets of 2 mg. each were prescribed at bedtime. This simple initial regimen was followed willingly by every patient.

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In the milder hypertensives, blood pressure was maintained within a normal range by Rauwiloid alone. In the more severe cases, more potent hypotensive agents were added when the course of severity warranted their use.

In such cases, Veriloid, hexamethonium, or Apresoline were added to Rauwiloid. Smaller doses of the more potent drugs produced full therapeutic effects when combined with Rauwiloid. The combination resulted in a notable reduction in the incidence of side actions of the potent agents. This observation agrees with that made by several other investigators.<sup>2,3</sup>

#### TREATMENT WITH RAUWILOID ALONE

Rauwiloid alone was given to 8 of the patients in the series. Of these patients, 2 had been on mannitol hexanitrate therapy previously, but maintenance of reduced pressures had been difficult. Others had been treated by such measures as diet, sedation, and so forth. In 3 instances, the hypertension was asymptomatic, and was discovered upon examination for another ailment. Although each of these cases presented an individual problem, all appeared to have benefited to some extent from Rauwiloid therapy. Blood pressures were not always reduced to the normotensive range, but they were stabilized at levels which appeared satisfactory for the individual. All cases were followed for at least six months. A summary of these cases is presented in table 1.

#### TREATMENT WITH RAUWILOID + VERILOID

In this series, 11 patients fell into the group considered to have moderately severe hypertension, requiring Rauwiloid + Veriloid therapy. I believe that many of the early therapeutic difficulties could have been allayed, had therapy with Rauwiloid + Veriloid been available earlier.

Veriloid, when combined with Rauwiloid, can be used in smaller doses for full hypotensive effect. As a rule, the result is a rapid lowering of blood pressure with fewer side actions. In these 11 cases, no instances of emesis occurred due to Veriloid when the drug was combined with Rauwiloid. Results of therapy in these cases are summarized in table 2.

TABLE 1 RAUWILOID

1								
						Blood pressure		
Patient	Diagnosis	Fundi	Control blood pressure®	Previous therapy and response	Rauwiloid dosage	after Ranwiloid*	Additional therapy	Comments
Female, age 60	Hypertension, headache, tension anxiety state	Normal	170/110	Sedation, no effect	2 tablets (4 mg.) h.s.	160/90	None	B.P. dropped to 135/85 during spell of very hot weather, rose to 145/100 with onset of ecoler weather. Neryons torsion benefitted markedly.
Female, age 64	Hypertension, postsurgical	Normal	190/80	None	2 tablets (4 mg.) h.s.	145/70	Hydralazine, 25 mg., t.i.d.	Rauwiloid produced bradyeardia, pulse rate below 60. Changed to hydralazine, pulse rate rose to ahove 80.
Female, age 65	Hypertension, arthritis, obesity	Normal	185/110	Sedation, sodium restriction, reduced B.P. to 170/105	2 tablets (4 mg.) h.s.	130/80	None	
Male, age 55	Hypertension	Normal	210/95	Mannitol hexanitrate reduced B.P. to 190/90	2 tablets (4 mg.) h.s.	170/80	None	
Male, age 56	Hypertension	Normal	210/105	Sedation, reduced B.P. to 180/100	2 tablets (4 mg.) h.s.	140/80	None	
Female, age 62	Hypertension, vulvar itehing	Normal	170/110	None	2 tablets (4 mg.) h.s.	150/95	None	Surgery for leukoplakia.
Female, age 63	Hypertension, diabetes, obesity, eardiac hypertrophy	Grade III	210/100	None	2 tablets (4 mg.) h.s.	170/110	None	No effect on diabetes. When Rauwiloid was stopped B.P. rose to 220/115. Controlled again with Rauwiloid. With Rauwiloid + Veriloid, B.P. 160/100.
Female, age 61	Hypertension (13 years), left ventricular enlargement	Grade II	195/110	Sedation, mannitol hexanitrate, poor response	2 tablets (4 mg.) h.s.	145/85	None	

Blood pressure figures represent average of many readings

#### TREATMENT WITH RAUWILOID + HEXAMETHONIUM

In 3 instances, the hypertensive disease was considered severe enough to warrant use of a more powerful hypotensive agent. In each case, a combination of drugs was found necessary, after trials with other modes of therapy, such as diet, surgery, or single drugs resulted in irregular or inadequate response.

My experience is consistent with that of Ford and Moyer<sup>4</sup> who have reported that more patients obtained adequate reduction of blood pressure from a combination of Rauwiloid and hexamethonium than from any single drug or combination of drugs previously reported from their clinic. The high incidence of a pronounced emotional overlay in even the severest cases of fixed hypertension makes the coadministration of a tranquilizing agent such as Rauwiloid an essential part of management. The response to therapy with Rauwiloid + hexamethonium is summarized in table 3.

#### DISCUSSION

The classification of hypertensive patients according to severity has been attempted by several authors. Such classifications have been useful as a basis for broad groupings with respect to therapy and prognosis. Yet, even in a small series, such as the one herein reported, a number of patients can be found whose response to drugs is either aberrational or resistant. These responses, when encountered, are not always related to the severity of the hypertension.

Another problem is the question as to how much reduction in blood pressure is to be sought. A patient's "ideal" arterial pressure may be slightly above what might ordinarily be considered "normal" for him. In such a case, the disappearance of hypertensive symptoms and a feeling of well-being may be achieved with a minimum of therapeutic trial and error by initiating treatment with Rauwiloid. Further reduction in pressure often follows the addition of ancillary measures, such as weight loss, when indicated. In other instances, a combination of drugs may be necessary in order to obtain an optimal blood pressure drop.

Since there is no single ideal drug for all hypertensive patients, I have considered it wise to employ first the mildest

 $\begin{array}{c} \text{TABLE 2} \\ \text{RAUWILOID} + \text{VERILOID} \end{array}$ 

Patient	Diagnosis	Fundi	Control blood pressure	Previous therapy and response	Rauwiloid + Veriloid dosage	Blood pressure after Rauwiloid + Veriloid*	Additional therapy	Comments
Male, age 52	Hypertension (3 years), neurodermatitis, left ven- tricular hypertrophy	Grade II	200/100	Mannitol hexanitrate, Tolserol, poor response, Veriloid, 4 mg. t.i.d., good hypotensive response	I tablet t.i.d.	165/95	None	Veriloid produced good hypotensive response, but side actions were prominent. Good response, no side actions, to Ranwiloid + Veriloid.
Female, age 52	Hypertension, menopause, ohesity, cardiac hypertrophy	Grade III	230/135	Vertavis-phenobarbital, poor response	l tablet t.i.d.	175/110	Reducing diet, sodium restriction	When changed to hexamethonium and hydralazine, response was not as good.
Female, age 60	Hypertension, tension anxiety, G.I. complaints	Normal	200/110	Various hypotensive agents, poor response	l tablet t.i.d.	145/90	None	Unable to maintain on Rauwiloid alone. Skin rash from phenobarbital.
Female, age 67	Hypertension (8-10 years), vertigo, C.V.A. residuals, cardiac hypertrophy	Grade III	215/130	Vertavis-phenobarbital, low sodium, poor response	l tablet t.i.d.	170/100	Hexamethonium 1.0 gm. per day	Following second minor c.v.a. and emotional upset, hexamethonium was added.
Female, age 53	Hypertension, P.V. disease, cardiac hypertrophy	Grade II	240/130	None	1 tablet t.i.d.	190/105	None	Early response to Rauwiloid + Veriloid was promising, but patient was uncooperative.
Female, age 65	Hypertension, cardiac hypertrophy	Grade II	220/120	Vertavis-phenobarbital, fair response	1 tablet t.i.d.	165/90	Sodium restriction	
Female, age 63	Hypertension, obesity, cardiac hypertrophy	Grade II	215/115	None	1 tablet t.i.d.	180/100	None	
Female, age 51	Hypertension, menopause	Normal	220/130	Sedation, low sodium, poor response	1 tablet t.i.d.	155/95	None	When changed to another agent, the response was not as good.
Male, age 68	Hypertension, cardiac hypertrophy, pneumonoconiosis	Grade II	240/120	None	1 tablet t.i.d.	180/90	None	When therapy was stopped, blood pressure rose.
Female, age 61	Hypertension, rheumatoid arthritis	Grade II	180/105	None	l tablet t.i.d.	155/90	None	
Female, age 47	Hypertension, obesity	Normal	190/100	None	l tablet t.i.d.	170/100	Reducing diet, sodium restriction	

\*Blood pressure figures represent average of many readings.

 $\begin{array}{c} \text{TABLE 3} \\ \text{RAUWILOID} + \text{HEXAMETHONIUM} \end{array}$ 

Comments	Patient uncomfortable when B.P. drops below 170/115 standing,	Upon addition of Rauwiloid to the small dose of hexamethonium, there was further fall in B.P., decreased symptoms.	No progression of changes in heart and fundi.
al '	Patient drops be	Upon addi small dose was furthe symptoms.	
Additional therapy	None	None	Hydralazine 200 mg. daily
Blood pressure after Rauwiloid + hexamethonium	180/115 sitting 170/115 standing	175/100 sitting 155/100 standing	190/95 sitting 190/95 standing
Rauwiloid + hexamethonium dosage	Rauwiloid 4 mg., hexamethonium 125 mg. q.i.d.	Rauwiloid 4 mg., hexamethoniun 250 mg. q.i.d.	Rauwiloid 4 mg., hexamethonium 125 mg. t.i.d.
Previous therapy and response	Several hypotensive agents, unsatisfactory clinical response	Veriloid reduced B.P. to 170/100	Sympathectomy, poor response. Hexamethonium, low salt, hydralazine, poor response
Control blood pressure	230/125	210/110	240/110
Fundi	Grade II	Grade II	Grade II
Diagnosis	Hypertension (10 years), cardiac hypertrophy	Hypertension (3 years), menopause, cardiac hypertrophy	Hypertension (4 years), previous C.V.A., cardiac hypertrophy, obesity
Patient	Female, age 64	Female, age 52	Female, age 55

\*Blood pressure figures represent average of many readings.

and safest of the effective hypotensive agents, Rauwiloid. Among its advantages is its mild sedative effect and the sense of well-being it engenders. After the full hypotensive effect is apparent, usually in two to four weeks, eonsideration is given to the addition of a more potent hypotensive agent if indicated.

In instances where such eombinations are needed, smaller doses of the more potent hypotensive drug can be given with full therapeutic effect. Thus, untoward side actions are greatly

redueed.

The patient's ecoperation in following instructions is one of the most important phases of therapy. If the patient experiences some improvement in symptoms carly in the course of treatment, he tends to cooperate more willingly. The simplicity of dosage schedule is another aspect of treatment upon which patient eooperation depends. Thus, it is important to avoid confusing dosage schemes and multiple dosage forms when more potent agents are added to the regimen.

For these seasons, Rauwiloid has served well in the management of this series of patients. No

untoward side actions resulting from its use were noted in any patient. When Veriloid was combined with Ranwiloid, the therapeutic veratrum effect was apparent at smaller dosage, and without toxicity. This was particularly noted in a case (table 2) in which effective doses of vcratrum alone had previously caused emesis. The combination of Rauwiloid with the ganglionic blocking agent hexamethonium similarly permitted the hypotensive effect of ganglionie blockade with a minimum of postural hypotension and of side actions from parasympathetic blockade.

#### SUMMARY

Rauwiloid, a selective alkaloidal fraction of Rauwolfia serpentina appears to be an effective, mild hypotensive agent. It can be used alone in mild, labile cases of hypertension, or in combination with more potent hypotensive drugs in the more severe eases. A personal series of 22 unselected patients with hypertension is reported, illustrating some experiences with drug therapy.

Rauwiloid and Rauwiloid with Veriloid used in this study were furnished by Riker Laboratories, Inc.

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Continuous intravenous administration of Neosynephrine may correct acute hypotension unresponsive to blood transfusion and avert irreversible shock. To obtain the desired pressor effect without overloading the circulation, Harold F. Rheinlander, M.D., Robert M. Kaplan, M.D., and Benjamin Etsten, M.D., of Tufts College, Boston, adjust the concentration of the drug and the rate of infusion to circumstances. In a group of 5 patients the strength of the infusate was from 10 to 800 mg. per liter. In 1 case of massive hemorrhage, the total dosage for the six days of infusion was 2,539 mg. The concentration, 40 mg. in 500 cc. of 5% dextrese in water at first, was gradually decreased. In another case, 2,510 mg, was administered in a concentration of 80 mg, in 500 cc. for four days.

HAROLD F. RHEINLANDER, ROBERT M. KAPLAN, and BENJAMIN ETSTEN: Bull. New England M. Center 16:1-7, 1954.

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To eonsider reports of the Council, Councillors, Delegate to the A.M.A., and Member of the Medical Center Advisory Council: THOMAS PEDERSON, Chairman Jamestown
G. W. TOOMEY Devils Lake
HANS GULOIEN Dickinson C. J. KLEIN . Valley City To eonsider reports of Standing Committees, except the report of the Committee on Medical Economies and its sub-committees: A. R. SORENSON, Chairman Minot
R. C. PAINTER Grand Forks
R. E. MAHOWALD Grand Forks
A. C. BURT Fargo
A. K. JOHNSON Williston To eonsider report of the Committee on Medical Economies, including sub-committees on Prepayment Medical Care, Veteran's Medical Service, and Rural Health: C. H. PETERS, Chairman Bismarck
A. C. KOHLMEYER Larimore E. J. BEITHON Wahpeton
J. D. CRAVEN Williston
W. R. FOX Rugby Committee on Resolutions, to include New Business: 
 R. O. SAXVIK, Chairman
 Jamestown

 A. C. FORTNEY
 Fargo

 G. CHRISTIANSON
 Valley City

 W. C. DAILEY
 Grand Forks

 L. O. PEARSON
 Mayville
 Committee on Credentials: 
 Institute on Creaminas:
 Fargo

 E. M. HAUGRUD, Chairman
 Fargo

 G. M. HART
 Minot

 CHARLES GRAHAM
 Grand Forks

 JOHN JANSONIUS
 Jamestown

 F. R. ERENFELD
 Minot

# PROCEEDINGS OF THE HOUSE OF DELEGATES of the North Dakota State Medical Association Sixty-Seventh Annual Meeting First Session, Saturday, May 1, 1954

The first session of the House of Delegates of the North Dakota State Medical Association was called to order by the Speaker of the House, Dr. G. A. Dodds, at 4:30 p.m. at the Dacotah Hotel, Grand Forks, North Dakota, May 1, 1954.

Dr. E. M. Haugrud, chairman of the Credentials committee, reported that all credentials were in order and a quorum of 18 duly elected delegates were present. The Secretary, Dr. E. H. Borth, called the roll. The following doctors responded:

G. W. Toomey, Devils Lake; A. C. Fortney, Fargo; Earl Haugrud, Fargo; A. C. Burt, alternate, Fargo; R. C. Painter, Grand Forks; John A. Sandmeyer, Grand Forks; J. D. Craven, Williston; A. R. Sorenson, Minot; G. M. Hart, Minot; G. Christianson, Valley City; C. J. Klein, alternate, Valley City; C. H. Peters, Bismarck; R. O. Saxvik, Jamestown; M. S. Jacobson, Elgin; R. W. Rodgers, Dickinson; Thomas Pederson, Jamestown; John Jansonius, alternate, Jamestown; K. G. Vandergon, Portland.

Eighteen delegates answered the roll call. The Speaker declared a quorum present.

The motion was made by Dr. Vandergon, and seconded by Dr. Fortney, that the reading of the minutes of the last session be dispensed with and accepted as printed in The Journal-Lancet.

At the suggestion of Speaker Dodds, that the reports of the President, Secretary, and Special Committees be referred to the proper Reference Committee, and that their reading be dispensed with, a motion was made by Dr. Haugrud and seconded by Dr. Peters that these reports be referred to the Reference Committee, number 1, Dr. Jacobson, Chairman.

#### REPORT OF THE PRESIDENT

It has been a distinct pleasure to serve as President of your association for the past year, largely because of the intense interest and loyalty of its members to the association. Time and again I have been amazed to see full attendance at committee meetings despite the effort and sacrifice of valuable time involved.

Since our last annual meeting many important meetings have been held, some decisions have been made and much fruitful discussion has taken place. I shall try to give you some idea of the nature of these meetings, although more detailed reports will appear elsewhere in this handbook.

The first meeting of importance was that of Dr. Jacobson and his Rural Health Committee, held in Jamestown early in September. The 100 per cent attendance of the committee members at this meeting started the year off well. A lengthy discussion followed, and a decision to be represented at the meeting of the North Dakota Public Health Association in Dickinson was reached. This meeting was held in October and our association was represented by members of the committee in addition to Drs. Halliday and Wright. Dr. Jacobson is to be commended for the intense interest he has, and the many sacrifices he has made for our association.

A meeting of the Medical-Press-Radio Conference was held in Jamestown late in September. This conference was initiated by our Executive Secretary, Mr. Limond, at Fargo the year before. This was attended by well over 100 people, both medical and lay, and the main address was given by Dr. Saxvik on the problems of Mental Health. It has been remarked frequently that lay people have an intense interest in medical news and in their own health problems, and this was brought forcefully to our attention by the many favorable comments by lay peo-ple after this meeting. To the medical men present, and there were many of them, perhaps nothing new or startling was brought out; but to the lay people the program was intensely interesting. We are prone to lose sight of this fact, and perhaps in the future we should give more time and attention to this aspect of our public relations. Complete credit must be given to Mr. Limond for starting and carrying forward this splendid method of improving our relations with a group very powerful in molding public opinion.

Your Committee on Medical Economics has been active particularly in the field of welfare fees, which has long been a thorn in the side of the medical profession in our state. A subcommittee consisting of Dr. Rodgers of Dickinson, Dr. Keller of Rugby, and Dr. Larson of Jamestown, was appointed to negotiate with the State Welfare Board, with the object in view of developing an equitable schedule of uniform welfare fees. This subcommittee met repeatedly with a representative of the State Welfare Board and a schedule was agreed upon which I think you will find satisfactory. This schedule was approved by the State Welfare Board and is now in the process of ratification by the various local welfare boards. This was an outstanding piece of work and we should be grateful to the members of this subcommittee for their unselfish devotion to this task.

On January 30, the interim meeting of the Council, as well as the meeting of the Crippled Children's Committee, was held in Fargo. A full attendance, including all the officers of the association, was present at the council meeting and a full account of the proceedings is published elsewhere in this handbook. Some duplication of functions of the Crippled Children's Committee and a special advisory committee appointed by Dr. Paul Johnson of the Crippled Children's Service seems to have arisen. This was discussed at the meeting of the Crippled Children's Committee and no conclusion was reached. Perhaps the House of Delegates should consider this problem at their May meeting.

On February 20, two important committee meetings were held in Jamestown, both well attended and both stimulating to those attending. The Mental Health Committee met at the State Hospital offices of Dr. Saxvik, and the problems related to this committee were thoroughly discussed. Dr. Saxvik presented several problems requiring the cooperation of the medical profession and, of course, this cooperation will be forthcoming. Dr. John Freeman, the new clinical director of the State Hospital, was present and took part in the discussions. Dr. Freeman has a splendid background in psychiatry and medicine, as well as an earnest desire to be a part of organized medicine in our state. With the combined efforts of Dr. Saxvik and Dr. Freeman, I know that the results in treatment of the mentally ill will improve, with consequent benefits to the entire profession.

The meeting of the Medical Education Committee was held the same evening in Jamestown, with an attendance of about 20 interested physicians. Under the chairmanship of Dr. Berg, a stimulating discussion was held and Dean Harwood was present to outline the problems as apparent to him after his short period in office. It has been my privilege to meet and hear Dean Harwood on several occasions, and 1 am convinced that under his leadership, and with our cooperation, medical education will be guided forward in a manner consistent with the

highest standards in our state.

In conclusion, let me thank the members of our association for the privilege of serving in some small way the cause of organized medicine during the past year. The way has been lighted by our distinguished predecessors, and I am sure the future will show such progress as would please the founders of our great profession.

JOSEPH SORKNESS, M.D., President

#### SECRETARY'S REPORT

MEMBERSHIP: The total membership for 1953 was 409. Of this number, 368 paid the regular membership fee, 13 were on a retired or limited basis and 12 were honorary members. Sixteen memhers were carried on a complimentary basis due to military service and age. Seven members passed away during the year and several have left the state. New members, however, are being steadily added to our roster.

Table 1 shows the annual membership for the past eight years. From this table one can see that the membership shows a slow

but appreciable gain since 1946.

TABLE 1
COMPARISON OF ANNUAL MEMBERSHIP

	1946	1947	1948	1949	1950	1951	1952	1953
Paid memberships	322	342	356	364	356	362	362	368
Honorary memberships Retired and limited	9	8	5	13	12	11	10	12 13
Dues cancelled, military service and								
age exemption	57	4	_	-	-	11	12	16
	388	354	361	377	368	384	384	409

Table 11 shows the annual dues for 1954, which are coming in quite promptly. There are still a number of members, however, who have not as yet paid their 1954 dues and the District Medical Society Secretaries and Councillors are urged to use every possible means to collect the dues of these delinquent members.

		TABI	E 11				
	May 1 1948	April 15 1949	April 30 1950	April 30 1951	April 15 1952	April 20 1953	April 10 1954
Paid-up members	320	302	309	307	249	296	323
Honorary members	6	9	11	11	8	9	13
To be honorary Dues cancelled,		4	1	2	2	3	4
military service Associate	1	1			11	12	4
Limited Retired							1 7
	327	316	321	320	270	320	352

		1080				
		1953-			-1954	
	Reg.	& Ret.	Hon.	Reg.	& Rtd.	Hon
First	67	1	_	65		1
Devils Lake	24	-	3	22	_	3
Grand Forks	48	-	_	57	_	2
Kotana	12			13		_
Northwest	24	_	2	51	1	3
Sheyenne Valley	10	1	-	9	-	_
Sixth	57	8	3	50	3	3
Southwestern	15	_	_	19	2	_
Stutsman	18	_	1	29	_	1
Traill-Steele	11	_	_	8	1	_
			_		_	-
	286	10	9	323	7	13
	2	96		3	330	

A.M.A.	GENERAL.	MEMBERSHIPS	

	1953	1954
First	. 69	62
Devils Lake	. 25	21
Grand Forks	. 56	52
Kotana	. 12	13
Northwest	. 56	51
Sheyenne Valley	. 10	9
Sixth	. 68	47
Southwestern	. 10	4
Stutsman		28
Traill-Steele	. 10	7
	339	294

Several of the societies show a paid-up membership roster for the current year, but others have forwarded only partial reports. The constitution and by-laws of the North Dakota State Medical Association states that such dues should be forwarded the state office not later than March 1 of the current year and due to the piess of work in the state office prior to the annual meeting, it would be extremely helpful to the office staff if a majority of the membership dues were processed earlier in the year. It is encouraging to note that the report shows a great many more paid-up members in 1954 than in 1953, at this time. It will also be noted that, although March 1 is the stipulated date for the receipt of dues, this report is shown as April 10, to give an up-to-date picture of paid memberships.

The Secretary has kept in touch with the operations of the state office and wishes to commend Mr. Limond and his staff for their

excellent work.

E. H. BOERTH, M.D., Secretary

#### **EXECUTIVE SECRETARY'S REPORT**

MEETINGS: Your Executive Secretary attended several meetings and made many personal contacts with individual physicians, newspaper editors, legislators, radio station personnel, hospital administrators, nurses, dentists, and others. A rather complete listing will be found in the Travel Log of the Executive Secretary a little further on in these pages.

I was fortunate in being able to attend at least one meeting of

each District Medical Society this past year.

The School Health Lectures were again presented in cooperation with the North Dakota State Dental Association at the five Teachers' Colleges. Dr. W. E. G. Lancaster was present at Mayville and Valley City. Dr. Ellis Oster handled Ellendale, Dr. A. E. Spear spoke in Dickinson, and Dr. O. W. Johnson was present in Minot.

Your Executive Secretary was in attendance at the meetings of the special liaison committee and Mr. Ralph Atkins of the North Dakota Public Welfare Department in conjunction with the new welfare fee schedule. I was also able to meet with the county commissioners and representatives of county Executive Secretary Welfare offices in discussing the new welfare fee schedule in 4 of the 8 cities in which these meetings were held. At each of these meetings, 1 or more physicians were present to answer questions.

The second Annual Medical-Press-Radio Conference was held in Jamestown on September 26, 1953. From comments received by those in attendance, it can be considered a successful venture.

It is felt that the various committees were not too active this past year. There should be some thought to further streamlining. Your state office has aided in the work of those committees which were active this past year and your Executive Secretary was, with one exception, present at all committee meetings. It is suggested that the meetings of the several committees be held in the fall and early winter months. If this is done, it will facilitate getting out the Handbook during the first two weeks in April. It is further suggested that all committee reports should be in the state

office by March 15 so that the printing of the Handbook can be expedited.

STATE OFFICE: During the past year we lost our original headquarters in the Little Building and are now located in the Eltinge Building at 2021/2 Third Street, Bismarck. We have one more move to make but it will be in the present building. I know that Mrs. Margaret Fremming and Mrs. Anita Meisner will be happy when we finally drop anchor.

Your headquarters office is continuing in its efforts to be of

ever greater service to the total membership, to public and pri-

vate health agencies, and to the public in general.

As you all know, it is from here that the monthly membership newsletter and the Auxiliary's newsletter is processed, the Vet-erans Medical Service Division discharges its duties, the Physicians' Placement Bureau functions, the State Board of Medical Examiners' annual license renewals are handled, committee meetings are arranged and members notified, annual association and A.M.A. dues are processed, disbursement of Uniform Insurance Reporting Forms is recorded, plus many other duties too numerous to mention.

ANNUAL SESSION: Your Executive Secretary wishes to thank Dr. John Moore, General Chairman, his members of the several committees, and other memhers of the Grand Forks District Medwith whom he has worked in connection with the

1954 annual meeting.

It should be noted that the annual meeting continues to operate with a deficit, although we have added one or two firms each year to our list of technical exhibitors. The trend has been definitely downward since the Fargo meeting of 1952 in regard to the amount of the deficit. It is hoped that this trend will hold true for the present Grand Forks meeting.

PHYSICIANS' PLACEMENT SERVICE: Ten North Dakota communities and 14 physicians or groups have contacted this office since our placement service was established as an outgrowth of the annual session in Minot in May of 1953 regarding the securing of physicians.

Several avenues of publicity are being used or considered in getting the message to the public of our state, that the North Dakota State Medical Association is offering this service.

Inquiries by letter and personal visits to this office have been received from 22 physicians this past year in regard to openings existing in North Dakota.

This office has received no word to date as to any physicians having been placed because of our physicians' placement service.

THE TRAVEL LOG:

May 18-20-St. Paul. Attended the centennial meeting of the Minnesota State Medical Association.

May 25-27-Fargo. Attended the annual meeting of the North Dakota State Dental Association.

June 1-5-New York City. Attended the A.M.A. annual meeting. June 15-16-Grand Forks. Attended meeting of the Advisory Council to the Medical Center.

June 20-Jamestown. Met with our new President, Dr. Joseph Sorkness, to appoint men to committees of the North Dakota State Medical Association.

June 21-Forman. Attended "Dr. F. G. Hubbard Day" as representative of the North Dakota State Medical Association.

June 30—Ellendale. Gave a speech at the first anniversary of the local hospital. — LaMoure. Called at Dr. Neville Turner's office. - Jamestown. Present with Dr. R. O. Saxvik when he took over as the superintendent of the State Hospital.

July 1-Jamestown. Toured the State Hospital with Drs. Saxvik and Fisher. Called on Dr. Joseph Sorkness.

July 7-Minot. Called on Dr. Archie McCannel regarding the Board of Higher Education and Medical Center activities.

July 8-Minot, Kenmare, Rugby and Grand Forks. Called on Mr. DeLong of Minot State Teachers College regarding Health Lectures. Visited with Dr. D. J. Halliday on North Dakota State Medical Association business. Called on Dr. O. W. Johnson regarding activities of the Committee on Public Policy and Legislation.

July 9-Grand Forks. Called on Dr. Cornatzer at the University Medical School. Attended the International Great Plains Conference on Rehabilitation and Special Education as a re-

source person.

July 10-Grand Forks. Attended the International Great Plains Conference on Rehabilitation and Special Education. Called on President John West of the University regarding matters pertaining to the Medical Center. Attended the opening session of the North Dakota State Board of Medical Examiners.

July 11-Grand Forks. Called on Drs. Fritzell, Painter, and Berger regarding the annual meeting on May 1, 2, 3, and 4. 1954. Attended final session of the North Dakota State Board of Medical Examiners.

16-Minot. Attended the Health Lecture given by Dr. O. W. Johnson at the Teachers College.

July 23-Dickinson and Halliday. Drove Dr. A. E. Spear to visit with Dr. Zoya Kindinoff and members of the "Doctors Committee.

August 3-Steele, Jamestown, and Fargo. Called at the office of Dr. Anthony Zukowsky and the newspaper in Steele. In Jamestown, visited with Drs. Nierling, Larson, Pederson, Lucy, Miles, Hogan, Woodward, Elsworth, and McFadden, regarding the possibility of a local district medical-press con-

August 4—Fargo. Attended a councillors' meeting of the handicapped person. Visited Drs. Quamme and Varco at the V.A. Center as well as Messrs. Poole and Eugelstad. Called on

Dr. Lancaster and Mr. Litten at the Fargo Clinic.

August 5-Wahpeton, Forman, and Enderlin. Spoke to the local Kiwanis Club and visited Drs. Bateman, Miller, Thompson, Wiltse, and Wall. Called on H. H. Pfister, D.D.S., immediate past president of the North Dakota State Dental Association and his son, Jack Pfister, D.D.S. In Forman, called at the office of Senator Klefstad. In Enderlin visited with Dr. and Mrs. S. C. Bacheller and Senator Agness Geelan.

August 6-Fargo. Called on Drs. Sedlak, Gieb, Lancaster,

Christoferson, and Gustafson.

August 7-Jamestown. Visited with Dr. Saxvik at the State Hospital.

August 12-Elgin. Called on Representative Ralph Beede at the newspaper. Met with Dr. Jacobson regarding Rural Health Committee work. Visited with Dr. Bahamonde.

August 15—Bismarck. Met with Drs. E. J. Larson, E. T. Keller, and R. W. Rodgers at the Capitol. These men are the med-

and A. W. Rougers at the Capitol. These men are the medical advisory committee to the State Welfare Board.

August 18—Jamestown. Called on Dr. Sorkness, Dr. Jansonius, Dr. Vander Linde, Dr. Logan, Dr. Saxvik, Dr. Woodward, Dr. Christenson, Dr. Nierling, and Dr. Elsworth. — Valley City. Called on Mr. Seth Carlson, editor of the Times-Record and Dr. Walter Ciledor. and Dr. Walter Gilsdorf.

August 19-Fargo. Called on Drs. Long, Sedlak, and Landa.
 Portland. Called on Dr. K. G. Vandergon.
 August 19-Northwood. Called on A. L. Smeby, D.D.S., presi-

August 19—Northwood. Called on A. L. Smeoy, D.D.S., president of the North Dakota State Dental Association. — Sharon. Called Representative Thomas L. Snortland.

August 20—Grand Forks. Met with the following: Drs. Woutat, Fritzell, Hill, Painter, and Goehl to discuss annual meeting

plans.

August 21-Grand Forks. Met with Drs. Woutat, Youngs, Culmer, Grinnell, and Kohlmeyer to discuss further plans and meeting places of the 1954 annual meeting places of the 1954 annual meeting to be held in Grand Forks on May 1, 2, 3, and 4, 1954. Visited the new Dean of the medical school, T. H. Harwood, M.D. He had arrived in Grand Forks on August 15. Had a visit with Dr. Cornatzer of the medical school foodbar. Cornatzer of the medical school faculty.

August 22-Jamestown. Met with the Rural Health Committee of the North Dakota State Medical Association at the DePuy-Sorkness Clinic. This committee had a 100 per cent turnout

of its members!

August 27-Fargo. Attended a meeting of the Blue Shield Commission at the Gardner Hotel.

August 28-29-Fergus Falls. Attended the annual session of the Northern Minnesota Medical Association as the representative of the North Dakota State Medical Association.

September 1-3-Chicago. Attended the A.M.A.'s Public Relations Institute.

September 5-Jamestown. Met with representatives from the North Dakota State Dental Association and Dr. Joseph Sorkness. Dental men present were Dr. Smeby of Northwood, Dr. Sand of Fargo, Dr. Pfister of Wahpeton, and Dr. Mussberger of Jamestown. The dental folks are toying with the idea of using the services of the executive secretary of the North Dakota State Medical Association as a public relations consultant. Also called on Drs. Pederson, Saxvik, and E. J.

September 9-Richardton. Called at the offices of Dr. J. Moscs in Richardton; left card as he was out. — Dickinson. Called on Conneillor Amos Gilsdorf, M.D., in Dickinson. — New England. Visited with Dr. Curiskis of New England. Also called on Mr. Earl Rundle, president of the North Dakota Press Association and publisher of the Hettinger County Herald in New England. ald in New England.

September 12-Fargo. Attended the meeting of the North Da-kota chapter of the American College of Physicians. Called on Mr. Litten, business manager of the Fargo Clinic. Visited with Mr. Byron Jackson, President-Elect of the North Dakota

Hospital Association.

September 17-Jamestown. Called on Mr. Don Kingsley, program manager of Radio Station KSJB. - LaMoure. Called on and visited with the following: Mr. Charles Andrus, editor of the local paper; Representative Roy Holand; U. S. Senator Milton Young; Mr. C. J. Robideau, president of the North Dakota Insurance Federation, and Dr. N. W. Turner. - Litchville. Called on Mr. Berg, editor of the local paper. -

Valley City. Called on Dr. Gunder Christianson, Senator Foss, and Mr. Robert Ingstad of radio station KOVC.

September 18-19-Grand Forks. Attended the annual meeting of the North Dakota Society of Obstetrics and Gynecology.

September 20-21-Fargo. Attended, along with Drs. Sorkness and McFadden, the meeting of the Accident and Health Underwriters. Discussed our uniform insurance reporting forms. No complaints from these underwriters. On Monday, called on Drs. Long, Weible, and Melton. - Lisbon. Called on Dr. Ahner Veitch. - Jamestown. Called on Drs. Saxvik and Sorkness.

September 23-Valley City. Attended Dr. Meredith's funeral. September 25-Jamestown. Present at the meeting of the Gov-

ernor's Health Planning Committee.

September 26-Jamestown. Attended the successful Medical-Press-Legislative Conference put on hy the Committee on Public Policy and Legislation of the North Dakota State Medical Association.

September 27-Jamestown. Met and visited with a number of state legislators at the Langer rally. Did not stay for the

formal program.

September 28-Fargo. Called at the Blue Cross and Blue Shield offices. Attended the meeting of the First District Medical Society with our president, Dr. Joseph Sorkness.

October 6-Mayville. Attended the meeting of the Traill-Steele District Medical Society with the dean of the Medical School,

T. H. Harwood, M.D. October 12-Bismarck, Attended the Cerebral Palsy Clinic. Attended the meeting of the Sixth District Medical Society with Dean Harwood.

October 13-Dickinson. Attended the meeting of the Southwestern District Medical Society with Dean Harwood.

October 14-Williston. Attended the meeting of the Kotana District Medical Society with Dean Harwood and Dr. Joseph Sorkness

October 22—Valley City. Attended the meeting of the North Dakota Conference of Social Welfare. — Jamestown. Attended the Stutsman District Medical Society meeting.

October 25-Dickinson. Attended the meeting of the North Dakota Chamher of Commerce executive meeting.

October 26-27—Dickinson. Attended the annual meeting of the North Dakota Public Health Association.

October 28-Fargo. Attended the meeting of the Blue Shield

October 31-November 1-St. Paul. Attended the annual meeting of the North Central Medical Conference at which representatives of six state member medical associations were present-North Dakota, South Dakota, Iowa, Minnesota, Wisconsin, and Nebraska.

November 3-Fargo, West Fargo, and Horace.-Met with Drs. W. E. G. Lancaster, O. A. Sedlak, W. H. Long, and Roy Kulland.

November 9-Wishek. Visited with Dr. Franz Gutowski, Mr. Eugene Weist, druggist, and Mr. M. Brandt.

November 10-11-Fargo. Attended the first annual meeting of the North Dakota Mental Health Association.

November 14-15-Grand Forks. Met with the local arrangements committee to discuss plans for the 1954 annual meet-

November 21-Bismarck. Attended a meeting of the special advisory committee to the Crippled Children's Services Division of the North Dakota Public Welfare Board.

November 24-Bismarck. Attended a meeting of the Sixth District Medical Society.

November 28-29-Grand Forks. Attended a meeting of the Scientific Program Committee of the North Dakota State Medical Association.

November 30-December 1-Fargo. Visited the offices of Blue Cross and Blue Shield. Visited with Mr. Harry R. Poole, manager of the V.A., plus Dr. Varco and Mr. K. Engelstad at the V.A. Center. Visited with Drs. Lancaster, Sedlak, Dodds, Weible, LeMar, and Heilman.

December 8-Bismarck. Met with Mr. W. Miogdalen, V.A. contact officer, and Mr. Harry R. Poole, hoth from Fargo.

December 11-Bismarck. Attended a hospital safety meeting at the St. Alexius Hospital.

December 15—Bismarck. Attended a meeting of the Nurse Enrollment Committee of the North Dakota State Nurses Asso-

December 16-Bismarck. Attended a meeting of the North Da-kota Puhlic Welfare Board with Dr. R. W. Rodgers. Our proposed welfare fee schedule was adopted by the board.

December 19-20-Fargo. Attended a Blue Shield Board meet-

December 23-Bismarck. Attended a meeting of our Public Health Committee at the State Health Department. Heard a discussion of plans to use Dr. Salk's vaccine by Dr. Pothoff of the National Foundation.

1954-

January 6-Jamestown and Devils Lake. Visited Dr. R. O. Saxvik. Attended a meeting of the Devils Lake District Medical

Society with Drs. Sorkness and Pederson. January 7-Valley City and Fargo. Called Drs. Walter Gilsdorf and L. G. Pray, Visited with Drs. Varco and Kucera and Messrs, Poole and Engelstad at the V.A.

January 8-10-Grand Forks. Attended the meeting of the Board of Medical Examiners and the Advisory Council to the Med-

ical Center. January 11-Fargo. Attended the Tri-State March of Dimes dinner as the representative of our president, Dr. Joseph Sorkness.

January 16-Bismarck. Attended a meeting of the State Health Council.

January 19-Bismarck. Met with Mr. Ralph Atkins of the North

Dakota Public Welfare Department.

January 29-31—Fargo. Attended a meeting of the Committee on Crippled Children and the midwinter meeting of the conneil.

Fehruary 1-Bismarck. Attended a meeting of county welfare boards and county commissioners to discuss the new welfare fee schedule.

Fehruary 3-Fargo. Attended a meeting of county welfare hoards and county commissioners to discuss the new welfare fee schedule.

February 4-Jamestown. Attended a meeting of county welfare hoards and county commissioners to discuss the new welfare fee schedule.

February 6-11-Chicago. Attended a national meeting on Medical Éducation and Licensure. February 17-Grand Forks. Attended a meeting of the Grand

Forks District Medical Society.

February 18—Fargo and Wahpeton. Called on Dr. Lancaster and R. A. Sand, D.D.S., and H. H. Pfister, D.D.S.

February 19-Grand Forks. Attended a meeting of the local arrangements committee to discuss final plans of the annual meeting.

February 20-Jamestown. Attended the meetings of the Committees on Mental Health and Medical Education. February 23-Bismarck. Attended a meeting of the Sixth Dis-

trict Medical Society.

Fehruary 25-26-Dickinson and New England. Attended a meeting of county welfare hoards and county commissioners to discuss the new welfare fee schedule. Met with Drs. Goulding, Rodgers, and Gilsdorf. Called on Dr. Curiskis and Mr. Earl Rundle, president of the North Dakota Press Association in New England.

February 27—Jamestown. Attended a hoard meeting of the North Dakota Mental Health Association.

March 4-Bismarck. Attended a North Dakota nursing aides project meeting.

March 9-Jamestown. Met with Drs. Sorkness, Nierling, Pederson, et al.

March 10-Fargo. Met with Mr. Gene Bakke, and Mr. Byron Jackson, executive secretary and president-elect of the North Dakota Hospital Association, respectively. Called on Mrs. J. W. Snyder, executive director of the North Dakota Cancer Society.

March 11-Grand Forks. Met with several committee chairmen regarding the annual meeting. Called on Dean T. H. Har-

wood. March 17-19-Aberdeen, S. D. Met with R. G. Meyer, M.D. and Mr. John C. Foster, president and executive secretary, respectively, of the South Dakota State Medical Association, to discuss plans for the proposed combined meeting in 1956 of the North Dakota State Medical Association and the South Dakota State Medical Association, at which time the South Dakota State Medical Association is to celebrate its 75th anniversary.

March 23-24-Bismarck. Attended the NPL Convention as an interested observer.

March 29-Bismarck. Attended a meeting of the Finance Committee of the North Dakota Mental Health Association. March 31-Minot. Attended the cancer seminar of the North-

west District Medical Society. April 1-Devils Lake. Attended the cancer seminar of the Devils

Lake Region District Medical Society.

April 2—Grand Forks. Attended the cancer seminar of the

Grand Forks District Medical Society. April 5-Fargo. Attended the cancer seminar of the First District Medical Society.

April 6-Valley City. Attended the cancer seminar of the Sheyenne Valley District Medical Society.

April 7-Jamestown. Attended the cancer seminar of the Stutsman County District Medical Society. April 8-10-Valley City. Attended the anual meeting of the

North Dakota Press Association.

April 19-21—Jamestown. Attended the second annual work-shop of the North Dakota Mental Health Association.

April 27-28-Fargo. Attended and spoke at the annual meeting of the North Dakota Hospital Association.

FINANCE: The Treasurer's report continues to show a fairly respectable balance. But you will note the expenditures of the association exceeded the income by \$3,670.31. Some serions and constructive thought needs to be given this situation, especially when one recalls that the Conneil, at the Minot convention in May of 1953, voted manimously to keep the balance at not less than \$20,000. This balance is to be considered as a reserve fund.

Your Executive Secretary feels certain that the Council will solve this problem of finances since most of you are aware that a positive and forward looking program of public relations needs money to function. And that it is in good times that we levy against ourselves substantially to protect against the future possibility of encountering bad times when the levies may need a reduction.

Your state office remained within its budget this past year.

The collection of dues continues to be slow in many instances. The attention of the members is called to the association's constitution and by-laws, which states that all dues are to be in from the district societies on or before March in each year. All societies are urged to be prompt.

#### THOUGHTS FOR THE FUTURE:

1. The Physicians' Placement Burean to be considered as part of the activities of the Committee on Rural Health.

2. Rejuvenation of the Interprofessional Liaison Committee on Health. This committee was made up of representatives of the state associations of dentistry, medicine, pharmacy, hospitals, and nursing.

Continuation of the regional Medical-Press-Radio conferences.

4. A proposed constitutional change regarding reapportionment of the House of Delegates. Chapter IV, Section 2 of the by-laws. Proposed change to read: "Each component society shall he entitled to send to the House of Delegates each year, 1 delegate for every 15 members, and 1 for each major fraction thereof." This would incerase the House by at least 10 members; thereby increasing the possibility of building up greater interest in the activities of the association.

5. Inauguration of a regional series of Medical-Public Forums on timely and current health topics. For example: polio, ringworm of the scalp, etc.

6. Inauguration of a regional series of Medical-Legal Conferences.

7. Further consideration to be given to the invitation profered by the South Dakota State Medical Association to join with them in a Medical Journal of the Dakotas. It has come to my attention that the officers of the South Dakota State Medical Association are still interested in our association's attitude. The South Dakota Journal is definitely now on a sound financial basis. Johning with South Dakota would cost no more than we now pay for The Journal-Lancet which is \$2.00 per member.

8. Consideration should be given to investing an additional amount of the association's reserve funds in securities offering an interest rate of more than 1 per cent.

9. A certificate to be issued to the members of this association who have secured eligibility for honorary membership.

ACKNOWLEDGMENTS: Your Executive Secretary wishes to express his sincere appreciation to our president, Dr. Joseph Sorkness, and those other splendid gentlemen for their efforts in behalf of this association. My heartfelt thanks to all with whom this writer has had occasion to work during the past year in the association's program of public enlightenment to the great problems of medicine and of its efforts to bring ever improving medical services to the people of North Dakota.

Lyle A. Limond, Executive Secretary

#### Accounts of Executive Secretary

COMPARATIVE BALANCE SHEET
March 31, 1954

Assets				
Cash in bank	\$	3,840.44		6,416.93
* . •	\$	3,840.44		6,416.93
Liabilities				
Social security accrual	\$	30.00	\$	47.88
Withholding tax accrual		193.20		253.20
Fund Balances				
Convention fund	\$	(72.86)	\$	1,320.09
Public relations fund		(710.36)		-0-
Surplus				
Excess of assets over liabilities		4,400.46		4,795.76
	\$	3,840.44	\$	6,416.93
	φ	0,040.44	φ	0,410.33

#### CONVENTION FUND

Receipts and	Disb	ursement	s for tl	ie Pe	riod	fron
April 1,	1953	through	March	31,	1954	

Receipts         \$ 5,199.26           Disbursements         3,806.31		
Excess of receipts over disbursements Less: Opening balance	\$	1,392.95) (72.86)
Balance in Fund, March 31, 1954	\$	1,320.09
PUBLIC RELATIONS FUND		
Receipts       \$ 1,053.77         Disbursements       1,764.13		
Excess of disbursements over receipts	s	710.36
Less: Opening balance	4	(710.36)
Fund Closed Ont	\$	-0-

#### GENERAL FUND

Receipts and Disbursements for the Period from April 1, 1953 through March 31, 1954

Receipts: North Dakota State Medical Assn \$14,576.00	
American Medical Assn 82.23	
Total Receipts	\$14,6

# Salaries \$ 9,366.59 Office supplies and fixtures 717.78 Telephone and telegraph 454.26

relephone and telegraph	303.20	
Rent	408.00	
Cleaning	72.00	
Postage	223.91	
Travel	2,175.00	
Power and light	9.32	
Social security taxes	98.73	
Repair and upkeep	15.20	
Donations, dues, and subscriptions	215.00	
Personal property taxes	15.59	
Legal and andit	100.00	
Insurance	27.56	
Postage for Auxiliary	45.06	
Freight and delivery	67.50	
Printing and sundry	251.43	14,262.93

Excess of receipts over disbursements...

NORTH DAKOTA STATE MEDICAL ASSOCIATION
VETERANS MEDICAL SERVICE DIVISION
TRIAL BALANCE

March 31, 1954	
Debits	Credits
First National Bank \$2,983.83	
Medical accounts payable	\$2,247.50
Veterans Administration Center	. ,
North Dakota State Medical Association	2,500.00
Social security	18.66
Withholding tax	162.00
Salaries	
Office supplies 5.40	
Rental	
Power and light 1.96	
Telephone and telegraph 8.77	
Miscellaneous	
Furniture and fixture repair 15.00	
Depreciation reserve	908.87
Furniture and fixtures	
Deficit	
\$5,837.03	\$5,837.03

#### Report of the Treasurer

DR. E. J. LARSON, Treasurer
Schedule of Cash Receipts and Disbursements for the Period from
May 9, 1953 to March 31, 1954
Balance on hand, May 9, 1953,
1st James River National Bank \$28,125.39

1st James rever National Bank	\$20,123.39
Receipts:	
Dues \$15,695.00	
Interest on U. S. Government Bonds 112.50	
Interest on or or overament bonds : : : III-iso	
Total Receipts	15.807.50

	Lotai	receipts		 10,001.00
Total	Cash			 \$43,932.89
,	Vouche	ers No. 236 to	Disburse	

Checks No. 639 to No. 656 inclusive	
5-19-53 Mrs. J. D. Clark, Treasurer, Woman's	
Auxiliary	200.00

558.23

395.30

5-29-53 Mrs. Fae Byrne, steno. expense	240.00
6-10-53	210.00
Newberry Insurance Agency, treasurer's bond	25.00
Dr. O. W. Johnson, expense, phone and airline	128.98
6-11-53 Henry Waldren, student expense,	120.00
A.M.A. meeting	100.00
6-15-53	100,00
Office of Executive Secretary, expense, public	
policy and legislation .	977.75
policy and legislation Dr. W. A. Wright, expense, A.M.A. meeting	399.23
7-3-53 Office of Executive Secretary,	
one-fourth Budget, 1953-54	3,000.00
7-30-53 Dr. James D. Cardy, 1953 scholarship fund	500.00
8-28-53	
Office of Executive Secretary, deficit 1953 meeting	323.64
North Central Conference, 1953 dues	
9-10-53 Office of Executive Secretary,	
one-fourth yearly budget	3,000.00
10-19-53 The Journal-Lancet,	
association subscriptions	794.00
association subscriptions	
one-fourth yearly budget	3,000.00
12-23-53 Dr. W. A. Wright, expense, A.M.A. meeting	
St. Louis	225.33
1-7-54 North Central Conference, 1954 dues	100.00
3-13-54 Office of Executive Secretary,	
balance, 1953-54 budget	5,576.00
3-26-54 Office of Executive Secretary, expense, public	9
policy and legislation	786.38
3-31-54 First James River National Bank,	
bank charges for year	1.50
Total Expenditures	\$19,477.81
3-31-54 Balance on deposit,	
First James River National Bank	\$24,455.08
Other Fund Assets:	
U. S. Government Bonds	4,500.00
m . 1 m . 1	02007700
Total Fund Assets	\$28,955.08

#### SCHEDULE OF U. S. GOVERNMENT BONDS March 31, 1954

	Number	Date issued	Date due	Issue price
Series G	D280761-G	July 1942	July 1954	\$ 500.00
Series G	D280762-G	July 1942	July 1954	500.00
Series G	D280763-G	July 1942	July 1954	500.00
Series G	D280759-G	July 1942	July 1954	500.00
Series G	D280760-G	July 1942	July 1954	500.00
Series G	M1576326-G	July 1943	July 1955	1,000,00
Series G	M1576327-G	July 1943	July 1955	1,000.00
			Total	\$4,500.00

#### SPECIAL COMMITTEES

#### Emergency Medical Service

Because members of the committee are separated by considerable distances, an actual committee meeting has not been held during the year. However, correspondence has been carried on with a number of the committee members and a number of items have been discussed. No questions of any type have been referred to this committee for settlement and, so far, activity of the committee has had to do with the question of whether or not additional plans should be laid for civil defense activities of medical personnel in the various cities of the state. A skeleton setup exists in Fargo and some of the other larger towns but except for such a setup as the individual towns have attempted in line of civil defense activities, no elaborate setup has been evolved.

A number of questions have arisen in regard to the scope of the Emergency Medical Committee and its jurisdiction. Several committee members have expressed opinion that the activities of the committee should be limited to civil defense and that at this moment there is little or no activity which could be undertaken. Others have wondered whether or not the scope and jurisdiction of the committee should extend to emergency medical care in event of natural disaster, such as tornado or other disaster of that It seems to me that activity of this committee would be very largely controlled by a sharp definition of the scope and juris-diction of the committee. If it is to be limited only to medical activities within civil defense, then there is little for the committee to do except in actual outbreak of hostilities. On the other hand, if the committee has jurisdiction in event of natural disaster, there are a number of things which can be done to aid in making available certain items, such as blood, and other things that might be needed in remote areas of the state. In the latter situation, statewide planning is very essential and should be undertaken by the committee in cooperation with the state medical society and with the individual district and county societies. Such items as planning for movement of whole blood to affected areas, possibility of stock piling of basic medical supplies and drugs, and items of that sort should be considered. Also, integration of such agencies as the Red Cross and other relief agencies with the organized medical activities of the state should be thought of in advance and planned for.

If, on the other hand, the committee operates only under military conditions, in event of actual hostilities, then the planning must be closely associated with civil defense planning and for all practical purposes limited to the areas of population density in the state. Since there is much apathy in regard to civil defense organizations everywhere and since medical planning must be a part of this, the activities of the committee in this field would be sharply limited if such activity must be limited to the civil defense setup entirely. It should be pointed out that in some cities a considerable civil detense organization has been developed, though now largely inactive.

A number of recommendations should be made at this time. These are as follows:

1. Definition should be made of the scope, jurisdiction, and authority of the Committee on Emergency Medical Service. This should include whether or not the activities of the committee are limited only in event of hostilities and to military situations, or to provision of medical care in event of natural disaster, and also should indicate the degree of authority this committee has to act in cooperation with local medical facilities.

2. It is recommended that a state blood bank committee be

2. It is recommended that a state blood bank committee be established, as a part of Emergency Medical Service, to study the needs of the state. The activities of this committee should include the following: (a) Unification or at least agreement in methods used by the various blood banks of the state and some coordination between types of equipment used in various portions of the state. (b) Organization of a reciprocal credit system permitting transfer of credits to various areas of the state from the fully organized and operating blood banks. (c) Organize instruction facilities for blood bank personnel, preferably at a statewide level, to present new methods of blood bank technology to those actively engaged in blood banking. (d) To determine the role of the American Red Cross, the State Health Department Blood Banks in the state in supplying blood to remote areas of the state in the event of natural disaster or under military conditions.

3. It is recommended that geographic considerations be a major item in considering composition of this committee. Membership on the committee by persons separated by hundreds of miles may be more representative of various areas of the state but it also precludes the possibility of committee meetings. Since Emergency Medical Service will probably involve the areas of population density, it is probable that members of the committee should come from those centers. On the other hand, representation from other areas is highly desirable and it might be possible that a person be appointed to the committee from the district medical societies or groups of district medical societies from such areas. The possibility of adding ex officio members from allied professions, such as nursing, dentistry, and pharmacy should also be considered, since these persons are also intimately concerned in Emergency Medical Service.

JOHN D. LEMAR, M.D., Chairman

#### Committee on Industrial Health

Here is a report on the activities of the Committee on Industrial Health for the year 1953. Because of the distances between members of the committee, no formal meeting has been held during the year. If possible, it would be well to have the group meet during the state society meeting in Grand Forks early in May.

As chairman, I have not been entirely inactive. The steps taken have been primarily in my capacity as medical director for the State Workmen's Compensation Bureau. On November 4, 1953, I made a trip to Devils Lake, North Dakota, where I spoke to the Lake Region District Medical Society on Industrial Medicine as it concerns the Workmen's Compensation Bureau, and discussed the treatment and handling of severe injuries. This was well received by that local society. Later on this winter, I was asked to appear at the Southwestern Medical District Society meeting in Dickinson. This I did on February 13, 1954, and discussed general industrial problems as related to the compensation bureau, along with Mr. R. J. Sailer. Mr. Sailer is one of the commissioners from the bureau who spoke to the society on administrative affairs and compensation in general. Following the regular meeting, I gave a short talk on Trauma at the request of Dr. A. R. Gilsdorf under the auspices of the American College of Surgeons.

This is all I have to report as chairman of the State Committee on Industrial Health. I do not know of any other independent action that the other members have taken in regard to this committee's work.

I am very much interested in promoting a farm safety program early next fall to see whether we can prevent some of the serious farm accidents which occur during and as a result of the harvest of our state crops. 1 have in mind, in particular, "corn picker"

accidents wherein many of our farmers, old and young, lose all or part of an upper extremity. I saw and treated several last fall or part of an upper extensity. I saw and treated several tast fair personally, and I feel that it is something which we might be able to reduce in number with favorable publicity. I would like to see a state-wide program started early in the fall with newspaper coverage over the whole state, including pictures and examples of this needless injury. I have in mind, specifically, a Sunday coverage in the Fargo Forum, which is distributed throughout the state, and any other similar newspaper coverages we could get. I am sure that the surgeons in each community in the state could produce some good and impressive evidence from their own case files and records.

RALPH VINIE, Chairman

#### Committee on Mental Health

The committee members met in the office of the superintendent of the State Hospital in Jamestown on Saturday, February 20, of the State Hospital in Jamestown on Saturday, February 20, 1954. Members present: R. O. Saxvik, M.D., Jamestown; R. C. Turner, M.D., Grand Forks; L. A. Christoferson, M.D., Fargo; R. D. Nierling, M.D., Jamestown; and P. Roy Gregware, M.D., Bismarck. Others present: John Freeman, M.D., clinical director, State Hospital, Jamestown; and Lyle A. Limond, Bismarck.

The meeting opened at 2:30 p.m. with a discussion of the recommendations of the committee as submitted to the House of

ommendations of the committee as submitted to the House of Delegates at the Minot meeting of the North Dakota State Medical Association on May 9 and 10, 1953. This report is found on page 82 of the 1953 Handbook.

I. Follow-ups on patients sent to the Jamestown State Hospital will be sent back to the referring physician as soon as the hospital is physically capable of instituting this program.

2. The affiliated psychiatric training program for nurses will not be available for all North Dakota student nurses until the completion of the new nurses home in 1955.

3. This committee has not met with members of the board of administration since Dr. Thomas L. Gore left the state hospital and Dr. R. O. Saxvik became acting superintendent.

4. Efforts should be made to change the name of County Insanity Boards to County Board of Mental Illness.

- 5. The North Dakota State Medical Association should continue to give its support to the psychiatric clinics being planned for certain selected spots in the state. These clinics are under the control of the state hospital as part of the plan of decentralization in the field of mental health. The clinics are to give aid to the practicing physician in the field of preventative mental health.
- 6. The rehabilitation of patients at the Jamestown State Hospital has been considered and a plan will be developed to place patients in industry.

Under new business, the committee discussed the following:

1. The role of the state hospital in its educational program to

the North Dakota State Medical Association.

2. Support from the North Dakota State Medical Association needed in establishing new mental health laws. (a) Need for change in commitments from criminal action into the realm of medicine, (b) need for a law permitting a physician to commit a patient for thirty days for observation, care, and treatment, (c) need for a law on voluntary admissions changing the three-day notification of departure of patients to some longer period, and (d) need for an amendment of the law appointing the superintendent only on a yearly basis.

Two new recommendations were made:

I. Follow-up program to be instituted by the state hospital in which the local physician caring for the discharged patient is to report to the state hospital on the patient's progress. This is part of a long-term program.

2. Efforts should be made by the state hospital to set up a resi-

dency program as soon as possible.

R. O. SAXVIK, M.D., Chairman

#### Committee on Displaced Physicians

The displaced physician program in North Dakota is a closed affair. Two years ago the Board of Medical Examiners voted that no more foreign physicians were to be admitted into North Dakota

assimilate the displaced physicians program until we could adequately assimilate the ones we bave admitted up until now.

The time has come when the first of the displaced physicians have become full citizens. It is now up to the Board of Medical Examiners to re-examine and re-evaluate each physician individually and if they meet the board's qualifications, grant them a full license.

full license.

It is my feeling that as soon as the displaced physician is granted a full license, he no longer falls under the jurisdiction of this committee, so automatically this committee will cease to have any reason for its existence. Yet I feel it should be continued until the last displaced physician has been disposed of. Occasions may occur where it would be easier to call out a committee. sions may occur where it would be easier to call out a committee of this kind rather than to have to call an extra meeting of the State Board of Medical Examiners.

O. A. SEDLAK, M.D., Chairman

#### Committee on Diabetes

The members of the committee are as follows: E. A. Hannz, chairman, Grand Forks; T. E. Pederson, Jamestown; A. K. Johnson, Williston; Martin Hochhauser, Garrison; W. A. Stafne, Fargo; and R. M. Fawcett, Devils Lake.

The function of this committee again this year was the organization of the annual diabetes detection drive as part of Diabetes Week" in cooperation with the American Diabetes Association and the North Dakota Diabetes Association. An innovation in diabetes detection was employed this year - the use of Drey-Pak testers. The Drey-Pak consists of a small piece of filter paper (postage stamp size) in a small folder which contains space for name and address of the person being tested. Also included in the unit is an envelope with instructions on how to prepare the specimen and deliver it to the collecting stations for diabetes protection. They cannot be mailed due to postal regulations. The procedure is as follows:

The patient simply collects a sample of urine in a clean container at home, dips the filter paper into the specimen, and then hangs the filter paper up to dry. As soon as the specimen is dry, the sample is folded in an envelope and taken to a collection center. From there on the testing is miraculously simple, requiring only that large quantities of these samples be simultanously dipped into boiling Benedict's Reagent. The tester simply keeps on the alert for any filter paper showing a color reaction which constitutes a positive test.

This innovation eliminates the tedious, time-consuming, messy collection of numerous urine specimens and testing by the pre-

vious Clinitest method.

Through a generous contribution made to the state medical association by the North Dakota Public Health Service, a limited supply was available free of charge to the various district medical societies. Due to this very limited supply, requests were handled on a first come, first served basis until supplies were exhausted. Additional supplies of Drey-Pak could he purchased at the rate of 1½ cents per total unit (this included filter paper, envelope, and printed directions). The Grand Forks District Medical Societies overthing the State for the Drey Bake and also the ciety contributed \$150 for purchase of the Drey-Paks and also the Junior Chamber of Commerce in Grand Forks contributed \$150 for the purchase of additional Drey-Paks for use in the Grand Forks local detection drive. According to established policy, each district medical society was asked to vote for or against having its own local detection drive. Response was very poor in this re-gard. Throughout the state a total of only 5 communities took gard. Throughout the state a total of only 5 communities took part in the nationwide drive; namely, Dickinson, Jamestown, Grand Forks, Grafton, and Larimore.

Three district medical societies participated in the drive November 15 to 21, 1953; namely, Grand Forks, Stutsman, and

Southwestern.

Respective chairmen of committees on diabetes detection in

Respective chairmen of committees on diabetes detection in these areas were as follows: Grand Forks, James Leigh; Jamestown, Tom Pederson; and Dickinson, Keith Foster.

Each participating society considered its drive a success, particularly from the standpoint of public goodwill engendered by the medical profession. It is hoped that the Drey-Pak will create renewed enthusiasm for discovering the hidden diabetic. Our committee was not able to obtain the Drey-Pak for the drive until the middle of October. This did not allow sufficient time for medical societies to vote on participation in the drive through this new medium of testing.

No doubt the Drey-Pak will be made generally available at an

early date for next year's diabetes detection drive.

E. A. HAUNZ, M.D., Chairman

The Speaker of the House next asked for a motion regarding the reports of the council, eouncillors, delegate to the A.M.A., and member of the medical eenter advisory council.

It was moved by Dr. Haugrud and seconded by Dr. Sandmeyer that the reading of these reports be dispensed with and that they be referred to the proper reference committee. The motion carried and these reports were referred to Dr. Thomas Pederson, chairman of the reference committee No. 2, to eonsider these reports.

#### Report of the Chairman of the Council 1953-1954

The council met on May 9, 1953 at the Clarence Parker Hotel, Minot, North Dakota. Dr. R. H. Waldschmidt, chairman, called the meeting to order at 4:30 p.m. The following members were present: Drs. A. D. McCannel, C. J. Meredith, A. R. Gilsdorf, R. D. Nierling, C. J. Glaspel, J. C. Faweett, and R. H. Waldschmit.

Others present at the meeting were Drs. O. W. Johnson, president, W. A. Wright, E. H. Boerth, R. O. Saxvik, and Mr. Lyle A. Limond, executive secretary.

Dr. Saxvik gave a briefing to the members of the council on the North Dakota Mental Health Association. A discussion was held with regard to membership in this association by our state medical association. It was seconded and passed that the North Dakota State Medical Association purchase a life membership for \$50 in the Mental Health Association.

Mr. Limond discussed a new proposed legislative setnp in North Dakota, dividing the state into 49 legislative districts for the purpose of contacting legislators on the local level. No further proposal was made at the time, and it was tabled for discussion at a later meting.

It was moved, seeonded, and passed that the North Dakota State Medical Association establish a General Practitioner's Award in North Dakota.

The amount of \$25 was approved for the purchase of an A.M.A. directory for the state office.

After a general discussion, the expenditure of money sufficient for dues for the executive secretary to join the A.P.H.A. and the American Legion was authorized, so that he might sit in on these meetings as a listening post with regard to affairs pertinent to the medical association.

Dr. Mayer of Aberdeen, South Dakota, president-eleet of the South Dakota State Medical Association, and Mr. John Foster, their executive secretary, met with the council to extend an invitation for a joint meeting with the South Dakota Medical Association in 1956 in Aberdeen, and also to again extend an invitation to us to join with them in an all Dakota medical journal. This had been discussed at previous council meetings and turned down in favor of continuing with The JOURNAL-LANCET. Since then, the South Dakota Journal has been doing well, and they are apparently quite satisfied with it.

Both Mr. Foster and Dr. Mayer were asked to appear before the House of Delegates and present their invitations and suggestions to the House.

The eouncil was asked to approve the sum of \$100 to help defray the expenses of a delegate or delegates from the University of North Dakota medical school to the student A.M.A. medical meeting in Chicago. Considerable discussion was held on this, and it was felt from the standpoint of good relations, it might be money well spent. Such was authorized.

There was further discussion concerning the suggestion of the North Dakota State Dental Association, that they acquire the part-time services of our executive secretary for their association, his time to be used mostly in contact work throughout the state and helping to arrange their state dental meeting. As they had nothing to offer us in the way of a concrete proposition, the matter was tabled for the time being.

The meeting was adjourned at 6:30 p.m.

#### Second Council Meeting May 10, 1953

The second meeting of the council of the North Dakota State Medical Association was called to order at 2:30 p.m., Sunday, May 10, 1953 at Minot. Present were: Drs. R. H. Waldsehmidt, C. J. Glaspel, J. C. Fawcett, A. D. McCannel, C. J. Meredith, A. R. Gilsdorf, and R. D. Nierling. Also present were: Drs. O. W. Johnson, W. E. G. Laneaster, Joseph Sorkness, and Mr. Lyle A. Linnond.

The following budget was adopted for the ensuing year:

North Central Conference \$	100.00
Official meeting, stenographer	
(salary, \$175; expenses, \$100)	275.00
JOURNAL-LANCET	800.00
Salary, executive secretary	6,500,00
Rental	480.00
Lights	25.00
Telephone	400.00
Office supplies and postage	800.00
Stenographer	3,000,00
Traveling expenses, executive secretary	2,400.00
Miscellancous fund	750.00
Woman's Auxiliary	200.00
Scholarship, University of North Dakota	500.00
Committee on public policy and legislation	3,000.00
Defrayment of expenses of delegates to	
student A.M.A.	100.00
Subscription to Mental Health	50.00
Dues, American Public Health Association	15.00
Dues, Amercan Legion	6.00
Fund for President of the N.D.S.M.A.	
(to cover out-of-state travel)	200.00

Total Budget \$19,601.00

After considerable discussion, the \$500 scholarship prize to the medical school was to be voted on each year rather than to pass a resolution including this amount from one year to the next without further voting.

After considerable discussion, it was agreed that the expenses of the alternate delegate to the A.M.A. should be defrayed by the association.

The motion was passed that a sum of \$200 of the state funds be allocated in the future toward out-of-state traveling expenses for the president.

A motion was earried to the effect that a balance of no less than \$20,000 be earried in the treasury to meet any possible emergency.

It was moved, seconded, and passed that the Treasurer's Report be audited once a year by a C.P.A. and this report be presented to the executive committee of the council prior to the annual meeting for presentation at the time of the annual meeting.

A discussion was held as to raising dues for 1954, and this was tabled until the time of the next annual meeting to be held in Grand Forks.

It was decided by the council, in the way of correct definition, that the \$5 charged at the time of registration at the annual meeting would be called a "Registration Fee."

It was moved, seconded, and carried that the institution of a Physician Placement Service in the office of the state association be effected.

The council was then notified that Dr. R. H. Waldsehmidt had been elected second vice-president of the association, and the following doctors elected to the council: First District, O. A. Sedlak, Fargo; Third District, Nelson Youngs, Grand Forks; and Sixth District, R. B. Radl, Bismarek.

Election of officers of the council were as follows: Dr. J. C. Faweett, chairman of the council; Dr. A. R. Gilsdorf, vice-chairman of the council; and Dr. R. D. Nierling, secretary of the council. Drs. J. C. Faweett, R. D. Nierling, and R. B. Radl were elected to the executive committee.

It was moved and seconded, then earried, that \$200 of the state funds be allocated for stenographic service in compiling a history of the North Dakota State Medical Association from the year 1926 up to the present date.

As the last order of business, the council decided to earry on with The JOURNAL-LANCET for the coming year.

The meeting adjourned at 6:00 p.m.

The alloeation of the \$500 seholarship prize fund ap-

propriated for the University of North Dakota by the council of the North Dakota State Medical Association,

1. One to the student attaining the highest average mark in all of the required courses in anatomy in the first year. \$100.00

Kenneth Sell, Riverdale 2. One to the student attaining the highest average mark in all the required courses in physiology and pharmcology in the first and second year.

\$100,00. Walter H. Moran, Jr., Grand Forks 3. One to the student attaining the highest mark in all of the required courses in bacteriology and parasitology in the first and second year.

\$100.00. Walter H. Moran, Jr., Grand Forks 4. One to the student attaining the highest average mark in the

5. One to the student attaining the highest average in the work of the first year.

\$100.00 ...... Kenneth Sell, Riverdale

#### INTERIM COUNCIL MEETING January 30, 1954

The meeting convened at 7:30 p.m., January 30, 1954 at the Gardner Hotel, Fargo.

Councillors present were: Drs. J. C. Fawcett, Devils Lake; R. D. Nierling, Jamestown; A. D. McCannel,

Minot; Amos Gilsdorf, Dickinson; O. A. Sedlak, Fargo; and Nelson Youngs, Grand Forks.

Officers present were: Drs. Joseph Sorkness, president, Jamestown; P. H. Woutat, president-elect, Grand Forks; D. J. Halliday, first vice-president, Kenmare; R. H. Waldschmidt, second vice-president, Bismarck; E. H. Boerth, secretary, Bismarck; E. J. Larson, treasurer, Jamestown; G. A. Dodds, speaker, House of Delegates, Fargo; and Willard A. Wright, delegate to the A.M.A., Williston.

Others present were: Drs. W. E. G. Lancaster, Fargo; C. J. Glaspel, Grafton; R. O. Saxvik, Jamestown; and Mr. Lyle A. Limond, executive secretary, N.D.S.M.A., Bis-

marck.

There being 6 councillors present, a quorum was declared for the opening of the meeting.

Minutes of the meetings of May 9 and 10, 1953 were

read and approved.

Dr. Saxvik was then called upon to discuss the proposed use of Dr. Jonas Salk's vaccine for polio in a county or counties in North Dakota this spring. Dr. Saxvik gave an outline of the meeting of the Committee on Public Health of the North Dakota State Medical Association held in the health department offices at the capitol on December 23, 1953.

The National Foundation feels that Dr. Salk's unlicensed vaccine is safe. The counties or combination of counties in North Dakota to use the vaccine are: (1) Cass, (2) Burleigh-Morton, (3) Ward, (4) Stutsman-

Barnes, and (5) Grand Forks.

The council agreed with the Committee on Public Health that there should be no fee for immunizing the second graders with Dr. Salk's vaccine. The first and third graders are to be used as control groups. It was also brought out that the National Foundation would protect the M.D.'s in the use of this vaccine. It was suggested by the council that this mass immunization be administered without charge in cooperation with the local district medical societies.

Dr. Saxvik was then granted permission to speak on a mental health problem. Dr. Saxvik felt that aid in securing a new law should be given by the North Dakota State Medical Association in which physicians would be granted the privilege of committing a patient for thirty days without going through the County Insanity Board. The council advised Dr. Saxvik that this was a matter for study by the Committee on Mental Health of the North Dakota State Medical Association and recommendations from this committee should be presented to the House of Delegates on May 1-2, 1954 in Grand Forks.

Dr. D. J. Halliday, first vice-president, spoke on the proposed combined meeting with the South Dakota State Medical Association scheduled for Aberdeen in 1956. He felt that Lyle A. Limond, executive secretary, North Dakota State Medical Association, should meet with John Foster, executive secretary, South Dakota State Medical Association, and discuss the situation from all angles and then report to the House of Delegates in Grand Forks on May 1-2, 1954. Dr. Halliday stated that this was agreeable with his special committee. The council agreed and it was so ordered.

Dr. W. E. G. Lancaster, chairman of the Committee on American Medical Education Foundation, next reported on the A.M.E.F. meeting held in Chicago, which he attended January 24, 1954. As an outgrowth of the Chicago meeting, it was felt that the public must be convinced that the doctors of medicine believe in supporting their profession through contributions to the A.M.E.F. Booth space was granted for an A.M.E.F. exhibit at the annual meeting in May in Grand Forks.

The statewide welfare fee schedule was approved. This schedule had been presented by Dr. R. W. Rodgers, a member of the Medical Economics Committee, on December 16, 1953 to the North Dakota Public Welfare Board and they had agreed to it. The council moved

and passed the approval of the schedule.

The compilation of the history of the North Dakota State Medical Association since 1926 was discussed. Dr. McCannel stated that Betty Winters was to be contacted for the material. The councillors from each district were to aid in this project. Dr. Frank Darrow was to be contacted to see if he would undertake the task. Dr. H. E. French was also to be contacted in this project.

It was agreed that no contributions were to be given to any voluntary health organizations from the funds of

the North Dakota State Medical Association.

Continuation of the program of the Medical-Press-Radio Conferences was approved.

The \$500 scholarship prizes were approved for the school year ending in 1954.

The expenses of the annual meeting stenographer were

declared part of the convention expenses.

The proposal of the North Dakota Hospital Association to participate financially in the Medical-Press-Radio Conferences was approved.

The proposal by the North Dakota State Dental Association in which they wished to hire the services of the executive secretary of the North Dakota State Medical Association on a part-time basis, was tabled until further discussion with the dental association representa-

It was ordered that the central office in Bismarck, of the North Dakota State Medical Association observe the holidays agreed upon by the Bismarck Chamber of Commerce, and no others. One day a month vacation and sick leave was approved for the central office personnel.

Discussion of the proposed budget for 1954-1955 was postponed until the annual meeting in Grand Forks,

May 1-4, 1954.

The report on the Physicians' Placement Bureau was heard. It was suggested that greater publicity be given to the bureau and its activities.

After discussion, it was suggested that the time of the meetings of the council at the state meeting be set earlier so that the House of Delegates could likewise meet earlier, allowing the reference committees to finish their work without staying up all night. Time of meeting to be set by the chairman of the council and the

speaker of the house.

A proposed change in the constitution to increase the number of councillors, thereby making it easier to establish a quorum for a meeting, was discussed. The general consensus of the council was to the effect that too many members would be a detriment to the efficient work of the council, although it might be advisable to add one or two more members. There was a suggestion made that one or more additional councilor districts be created, specifically mentioning the Kotana District, which has a very active society, but no representation on the council. It was felt that a committee consisting of Drs. Radl, Sorenson, and Youngs should give it further study and present their plan to the House of Delegates meeting in Grand Forks in May 1954.

Discussion was next centered on a proposed change of the by-laws regarding reapportionment of the House of Delegates (chapter IV, section 2 of the by-laws). Proposed change to read "Each component society shall be entitled to send to the House of Delegates each year, one delegate for every fifteen (15) members, and one for each major fraction thereof." If this were consummated, it was felt that greater interest could be engendered in

the work of the association.

The council in general approved this suggestion, recommending its further consideration at the next meeting of the House of Delegates.

R. D. Nierling, M.D., Secretary

#### REPORTS OF COUNCILLORS

#### First District

This district society held monthly meetings in Fargo from September through April. In October, a meeting was held in conjunction with the district dental society. Senator Young was the guest speaker. Again in April we met under the auspices of the North Dakota Cancer Society. At this meeting, a citation was presented to Mrs. John Snyder for her professional educational program. The talents of Drs. Lund and Beahrs kept everyone highly entertained. The evening closed with a very wonderful presentation of Cancer of the Colon.

Other speakers of note included Dr. Lyle Hay who spoke on "Surgical Aspects of Pancreatic Disease" and Dr. Roy Holly who talked on "Anemia and Iron Metabolism."

During the year the subject of fluoridation was thoroughly discussed and largely through the efforts of doctors, dentists, and a very interested group called 'Mothers for Fluoridation," the measure to deprive Fargo of fluorides was defeated at the polls.

New members added to our society during the year are: Drs. David Jaehning, Richard Zauner, Maynard Gustafson, Paul Bei-

thon, and Wendell Wall.

New officers for 1954 are as follows: Drs. Frank DeCesare; president, Fargo; Hugh Hawn, vice-president, Fargo; and G. Howsecretary-treasurer, Fargo.

The delegates to the state meeting are Drs. Fortney, Haugrud,

O. A. SEDLAK, M.D., Councillo1

#### Second District

Devlis Lake District had a very good year, 1953-1954. We have a membership of 28 members, plus 2 honorary. We gained 4 new members during the year, and lost 1 by transfer. There were 8 regular meetings held, in 6 of which we had outside speakers with scientific papers. In addition to this, we had one evening devoted to the annual visits of our president, Dr. Joseph Sorkhars and Mr. Lyle A. Lingual, executive secretary. At any Sorkness, and Mr. Lyle A. Limond, executive secretary. At another meeting, we had as guest speaker, the new dean of the medical school, Dr. Theodore Harwood. Meetings have been very well attended in spite of the considerable distance some members have to travel.

Some of the subjects of current medical interest discussed during the year included that of the Four-Year Medical School; Medical-Press Conferences; Blue Cross-Blue Shield, and Prepaid Medical Care; National Education Fund Program; and the Crippled Children's Program.

Officers for the current year include: president, Dr. I. L. Lazareck; vice-president, Dr. J. Terlecki; secretary, Dr. L. F. Pine; ccusor, Dr. W. R. Fox; delegate, Dr. G. W. Toomey; and alternate delegate, Dr. W. R. Fox.

Harmony and good fellowship have prevailed throughout the vear.

JOHN C. FAWCETT, M.D., Councillor

#### Third District

As councillor for the Third District, I represent the Traill-Steele District Medical Society, as well as the Grand Forks District Medical Society. The following report was kindly submitted to me by Dr. Vinje, secretary and treasurer of the Traill-Steele

The officers for the year: president, Dr. K. G. Vandergon, Portland; vice-president, Dr. Robert McLean, Hillsboro; secretarytreasurer, Dr. Syver Vinje, Hillsboro; delegate, Dr. K. G. Vandergon, Portland; and alternate delegate, Dr. William Buckingham, Hillsboro.

The society has 12 members that have paid the state association dues and 10 members have paid the A.M.A. dues. Two of our 1953 members have left our district and 1 has not yet paid his dues for 1954. We had 3 regular meetings during 1953 with good attendance. One meeting was attended by Melvin Koons and A. A. Gustafson of the State Public Laboratory of Grand Forks, who gave full information about the epidemic of scalp ringworm ringworm.

Another meeting was attended by Dean T. H. Harwood, M.D., of the state medical school, who gave a comprehensive address on the nature and extent of medical education.

The Grand Forks District Medical Society has had a very active year. There are now 70 paid members. President for 1954 is Dr. W. H. Witherstine; vice-president, Dr. Tom Longmire; and secretary-treasurer, Dr. Charles Porter.

There were 8 meetings held during 1953. These were very well attended and the programs were of very high caliber. Dr. Jerome Syvertson, head of the department of bacteriology from the University of Minnesota, our States Attorney for Grand Forks County; Gordin Caldis; and Dean Harwood of the medical school, are a few of those who appeared on the programs.

Nelson A. Youngs, M.D., Councillor

#### Fourth District

The Northwest District has entertained the North Dakota State Medical Association since my last report. The state meeting was held in the new Y.M.C.A., where ample space was available, not only for the meeting of the council and the House of Delegates, but also for the commercial and scientific exhibits.

During the past year we have held 8 regular meetings.

Speakers were: Drs. John S. Gillam, Fargo, "Abortion problems;" L. A. Brown, Minneapolis, "Encephalitis;" Thomas H. Pool, Rochester, "Urology;" L. P. Howell, University of Minnesota, "Internal Medicine;" P. H. Potter, Grand Forks, "Medical School;" Robert Untendorfer, Minneapolis, "Parahypetthyroidism;" W. L. Macaulay, Fargo, "Recent Advances in Dermatology;" and J. Robert Schmidt, Minneapolis, "Heart Surgery."

Our last meeting was held in April when the Cancer Committee

gave the program.

During the year: 10 new members were admitted, 6 members were transferred, 3 members were away in service, and there were 2 honorary members in 1953. Total membership, 69.

Officers during the past year were: president, Dr. Paul Breslich; vice-president, Dr. Henry Kermott; secretary-treasurer, Dr. George Hart; delegate, Dr. D. J. Halliday; and alternate, Dr. A. F. Hammargren.

The new officers are: president, Dr. Henry Kermott; vice-president, Dr. Roger Sorenson; secretary-treasurer, Dr. W. B. Huntley; delegates, Drs. George Hart and A. R. Sorenson, and alternate delegate, Dr. F. R. Ercnfeld.

The Kotana district held 4 meetings during the past year. The

district society is comprised of 14 members.

President is Dr. C. O. McPhail, Crosby; vice-president, Dr. P. O. C. Johnson, Watford City; secretary-treasurer, Dr. D. E. Skjei, Williston; delegate, Dr. J. D. Craven, Williston; and alternate, Dr. A. K. Johnson, Williston.

A. D. McCannel, M.D., Councillor

#### Fifth District

The Sheyenne Valley Medical Society held 4 meetings during The scientific parts were very interesting. Dr. Lee Christopherson, Fargo, spoke on "The Concept, Diagnosis and Treatment of Intervertebral disc." Dr.William Spier, Fargo, gave an excellent discussion on "The Performance of an Autopsy."

The April meeting was held at the time the speakers for the North Dakota Cancer Society were here. Dr. Brian McGroarty gave a very interesting paper dealing with "Cancer of the Prostate." Dr. Sidney Shapiro gave a paper on "Malignant Tumors of the Brain.'

During the year we admitted 3 new members: Drs. Edwin Wicks, Valley City; and K. M. Wakefield and W. L. Fennell of Cooperstown.

The society, as well as the whole community, was saddened by the untimely death of Dr. C. J. Mcredith, Scptember 20, 1953. the untimery death of Dr. G. J. Santham, associates.

His passing has been keenly felt by all his associates.

W. H. Gilsdorf, M.D., Councillor

#### Sixth District

The Sixth District Society is the only medical society in the

The Sixth District Society is the only medical society in the Sixth District. Five meetings of this society were held during the year of 1953 with an average attendance of 47. The membership at the end of the year was 72.

During the year, Dr. E. Salomone of Elgin, who was vice-president of the society, left the state of North Dakota and Dr. John T. Cartwright of Bismarck was elected to replace him as the properties of the society. vice-president. Dr. R. H. Waldschmidt of Bismarck, who had been councillor of the district for many years, was elected second vice-president of the North Dakota State Medical Association at the 1953 annual session, and Dr. Robert B. Radl was elected to succeed Dr. Waldschmidt as councillor for the Sixth District.

Dr. Peters was elected by the society to replace Dr. Radl as a

Officers for 1954 are as follows: president, Dr. John T. Cart-wright, Bismarck; vice-president, Dr. Robert F. Nuessle, Bismarck; and secretary-treasurer, Dr. Robert Kling, Bismarck. The delegates to the North Dakota State Medical Association are as follows: Drs. M. S. Jacobson, Elgin; R. O. Saxvik, Jamestown; and C. H. Peters, Bismarck. The Board of Censors consists of Drs. E. D. Perrin, Bismarck; R. Henderson, Bismarck; and G. R. Lipp,

New members of the Sixth District Society are: Drs. Carl F. Oja, Ashley; James F. Harrington, Mandan; and Dr. P. Roy Greg-ware, Bismarck. Dr. Freddie Peterson was also admitted to the

society but has left the state of North Dakota.

Dr. Martin W. Roan of Bismarck passed away during the year. The guest speaker at the first meeting was Dr. Alexander Mc-Kewn of the staff of the Northern Pacific Hospital, St. Paul, who spoke on "The Diagnosis and Treatment of Arthritis." At the next meeting, the main speaker was Dr. Richard P. Jahn, Milwaukee, who spoke on the subject of "Emphysema." Dr. Jahn's appearance was sponsored by the North Dakota Tuberculosis and Health Association. At the next meeting, the members of the society were the guests of the North Dakota Capter Society and Health Association. At the next meeting, the members of the society were the guests of the North Dakota Cancer Society and the principal speakers were Dr. Bryan McGroarty of St. Paul, who presented a paper on "Cancer of the Prostate" and Dr. Sidney Shapiro of Minneapolis, Minnesota who spoke on "The Problems of Neoplasms of the Central Nervous System." At the next meeting, Dr. Harry E. Barnett of Chicago spoke on the "Clinical Aspects of Cerebral Palsy." Dr. T. H. Harwood, dean of the University of North Dakota Medical School, was also in attendance and gave a brief discussion relative to the medical attendance and gave a brief discussion relative to the medical school. At the last meeting, the speaker of the evening was Mr. Don Eagles, executive secretary of the North Dakota Blue Cross and Blue Shield, who discussed these two programs in the state of North Dakota.

R. B. RADL, M.D., Councillor

#### Seventh District

The Stutsman County Medical Society, which is the Seventh District, had 7 meetings during 1953 and 2 meetings thus far in 1954.

On January 22, 1953 the following officers were elected: pesident, Dr. Robert E. Lucy, Jamestown; vice-president, Dr. Clarence Martin, Kensal; secretary-treasurer, Dr. John Jansonius, Jamestown; delegate, Dr. T. E. Pederson, Jamestown; alternate delegate, Dr. John N. Elsworth, Jamestown.

A committee, headed by Dr. E. J. Larson, was appointed to study the welfare rates for the county welfare fee schedule.

A meeting was held on February 26, 1953. A committee to work with the County Welfare Beard to discuss a fee schedule.

meet with the County Welfare Board to discuss a fee schedule was appointed. The committee consists of Drs. E. J. Larson, John N. Elsworth, and John Jansonius. A medical film was shown following the business meeting.

On March 26, 1953 a meeting was held at the Jamestown Hospital. Dr. Alan Hayward of Gackle was elected to membership. Dr. Robert Howard, head of the Continuation Center of the University of Minnesota, presented a paper and slides upon

the differential diagnosis of jaundice.

On April 29, 1953 the annual cancer society program was held at the Jamestown Hospital. Dr. Sidney Shapiro of Minneapolis presented a paper and slides on "Malignant Tumors of the Brain" and Dr. Bryan McGroarty of St. Paul spoke on "Cancer of the Prostate."

On May 28, 1953, Dean William Potter of the University of North Dakota medical school was the guest speaker and 4 sophomore medical students, who were here for their preceptorships, were guests. Dr. Potter related many problems of the medical school, most of which arose as a result of a limited budget. He also discussed the present situation resulting from the law recently passed by the state legislature to proceed with the organization and development of a four-year medical school.

On Octoher 22, 1953, Dr. D. O. Ferris of the Mayo Clinic gave a talk upon the subject "The Modern Management of the Acute Abdomen." Drs. Vander Linde and Christenson of Jamestown, Dr. Craychee of Oakes, and Dr. Kuisk of Rutland were

voted into membership in the society.

On December 9, 1953, Dr. N. E. Turner of LaMoure and Dr. Harry Fandrich of Medina were voted into membership in the society. The speaker for the evening was Dr. William Sadler, associate professor of obstetrics and gynecology of the University of Minnesota medical school. He spoke upon the subject of "Functional Uterine Bleeding."

The society has had two meetings thus far in 1954. On January 28, 1954, a dinner meeting was held at the Moline Cafe. The following officers were elected: president, Dr. Robert L. Mc-Fadden, Jamestown; vice-president, Dr. Alan Hayward, Gackle; secretary-treasurer, Dr. Richard D. Nierling, Jamestown; delegate, Dr. T. E. Pederson, Jamestown; alternate delegate, Dr. John Jan-

sonius, Jamestown.

Dr. Gestur Kristjansson of Ellendale was voted into the society.

Dr. G. D. Icenogle, Bismarck, spoke on "Electroencephalography," showing various tracings, methods, etc.

The annual cancer meeting was held in Jamestown on Wednesday, April 7, 1954. Dr. John Hodgson and Dr. Oliver Beahrs took up the subject of "Carcinoma of the Colon."

R. D. NIERLING, M.D., Councillor

#### Ninth District

The Southwest District Medical Society had 4 official meetings in 1953 at Dickinson.

The first meeting was held on April 11, 1953. It was a combination business and scientific meeting. Dr. A. E. Spear discussed the use of serum globulin for this district. The Southwest District health offices were acting as a sub-depot. Dr. Thomas Gore, acting superintendent of the Jamestown Mental Hospital Gore, acting superintendent of the Jamestown Mental Adopted addressed the group. The organization, function, and personal problems were discussed. There was a general discussion of patient care. The function of the State Mental Health Clinic was also discussed. Drs. R. W. Rodgers, D. J. Reichert, and A. R. Gilsdorf were appointed as corporation members of the Blue Cross-Blue Shield corporation.

A second regular meeting was held May 1, 1953. The Southwest District Society acted as hosts to the North Dakota cancer society group. Guests were Drs. C. M. Lund of Williston; O. Johnson of Rugby, president of the North Dakota State Medical Association; Sidney Shapiro of Minneapolis; Brian McGroarty, St. Paul; and Mr. Lyle A. Limond, the state executive secretary. Dr. Brian McGroarty spoke on "Carcinoma of the Prostate and Its General Management." Dr. Sidney Shapiro spoke on "Malig-nant Tumors of the Brain." Dr. O. W. Johnson gave us the North Dakota cancer statistics.

Our next regular meeting was October 13, 1953. Dean T. H. Harwood of the University of North Dakota medical school was the guest speaker. There was general discussion regarding the pros and cons of a four-year medical school. Dean Harwood stated that more students were needed in the medical school. Physicians should attempt to encourage students to register in order to give the university a full quota.

The last meeting of the year was December 5, 1953. This was a combination business and professional meeting. The speakers were Dr. J. J. Spier, pathologist at St. John's Hospital, Fargo; and Dr. Vernon Weeks, department of internal medicine, Dacotah Clinic, Fargo. Dr. Spier discussed the pathology work at St. Joseph's Hospital, Dickinson. Dr. Vernon Weeks presented a paper on "Rheumatic Fever."

Officers elected for 1954 were: president, Dr. Robert F. Gilliland; vice-president, Dr. Keith Foster; secretary-treasurer, Dr. H. L. Reichert; delegate to state meeting, Dr. R. W. Rodgers; alternate delegate, Dr. H. E. Guloien; councillors to the society, Drs. A. J. Gumper, John McNeil, and A. A. Curiskis.

We have 23 active members to our society. The new members during 1953 are Drs. James Moses of Richardton and Robert Hankins of Mott.

A. R. GILSDORF, M.D., Councillor

#### Annual Report of the Delegate to the American Medical Association

Your delegate attended all meetings at the annual session in New York and the clinical session in St. Louis. In addition, I have attended all meetings of the council on rural health and the committee on hospitals and other services under the council on medical service. I am a member of both of these

Complete reports of the action of the House of Delegates hoth the New York and St. Louis meetings have been published in the Journal and I will not attempt to give a complete coverage of these meetings, but rather try to summarize the current posi-tion of the American Medical Association in regard to various matters in which doctors have a real interest.

#### FEDERAL LEGISLATION

1. The so-called Bricker Amendment to the Constitution. A great deal of confusion has resulted from the various interpretations of the proposed Bricker amendment to the Constitution. The A.M.A. has taken a definite position favoring an amendment to the Constitution so that treaty law and international agree-

ments will not contravene constitutional law in this country. An neiths will not contravele constitutional law in this country. An editorial in the Journal A.M.A., February 20, 1954, gives a clear statement of the A.M.A. position which is, simply, that we are not primarily interested in the wording of the constitutional amendment, but believe that all right thinking people will agree that no law should be operative in this country which would be contrary to the constitution. As a matter of interest, it may be stated that many of those people who in prior years were working actively for socialization of medicine and socialization in general through the federal government, are now trying to achieve their objectives by various maneuvers within and around the structure of the United Nations. Doctors have a real interest in seeing that socialistic measures do not become the law of the land by the back door, so to speak.

2. The A.M.A. actively supports the principle of the Jenkins-Keogh bill. This would permit self-employed persons to enjoy tax deduction for payments into a pension fund of their own. Taxes would be paid in later years when money was withdrawn from such a fund. This is a privilege already extended to industrial

pension plans.

- 3. The administration proposes that many self-employed, including the doctors, be included in the social security system and pay social security taxes of 3 per cent on their income below a certain figure. The A.M.A. opposes the compulsory inclusion of doctors in the social security system but has, of course, no objection to any doctor who wishes to voluntarily include himself under social security.
- 4. Reinsurance for Voluntary Health Plans. The proposed federal legislation providing for reinsurance of various types of health insurance plans is extremely controversial and at the present time po definite position has been taken on this subject. needs to point out the inherent dangers of federal reinsurance of our voluntary health system. The spending of federal monies for any purpose leads to a certain amount of federal control and the more money, the more control, and it could be easily visualized that through such a system the present volun-tary prepayment insurance might eventually become completely dominated by the federal authorities. In effect, reinsurance offers many potential dangers and there does not seem to be any present need for it.
- 5. The A.M.A. supports the extension of the provision of funds for extension of hospitals and other services as provided in the Hill-Burton program.
- 6. The A.M.A. supports grants for research projects and other activities of this type.

#### VETERAN'S AFFAIRS

In December 1952, at Denver, the House of Delegates passed a resolution calling on the federal government to cease providing medical care for veteran's non-service-connected disabilities, except in the case of neuropsychiatric and tuberculosis, where local facilities were not available. The principle here is very simple, but again a great deal of confusion has been generated by this simple resolution. The principle is whether or not the govern-ment is obligated to make the veteran a special class of citizen and provide him with medical care at government expense. With the increasing numbers of veterans, and the probability that every able-bodied male will be required to give service at some time, this presents a very large potential number of people entitled to medical care at government expense. This will lead to further great expansion of veteran's administration hospitals. As a practical matter, there does not seem to be a great deal that can be done about this at the present time, but a surprising number of inde-pendent individuals are coming to share the viewpoint of the medical profession on this matter. As might be expected, the A.M.A. is being subjected to a great deal of abuse from various veteran's organizations, notably, the American Legion. The committee on veteran's medical affairs of the council of medical service has been conducting a series of meetings throughout the country to better inform the profession of the nature of this problem and the exact position which the A.M.A. has taken.

#### OSTEOPATHY

A special committee was appointed to study the question of osteopathy and brought in at the New York meeting a very lengthy report. The gist of this report was that osteopathy should no longer be regarded as a cult; and that it would be ethical for medical men to consult with and give instruction to osteopaths. This report was adopted in principle but laid over for study for a year and will be again brought up at the San Francisco session in June.

#### PUBLIC POLICY AND PROFESSIONAL RELATIONSHIPS

The A.M.A. is engaged in an extensive campaign designed to improve the general public relations of the profession. This is best explained in the recent report of Dr. Walter Martin which was reproduced in Mr. Limond's March bulletin. In brief, Dr. Martin stated that the A.M.A. is interested in:

1. The cost of medical care and we recommend the use of prepayment insurance for those who are able to pay, and public assistance for the indigent.

- 2. Better physician distribution and this is being promoted by the national and state placement services.
- 3. The A.M.A. always has been primarily a scientific organiza-tion and a very large percentage of income is spent on various scientific activities designed to increase the quality of medical care.
- 4. Medical education has been stimulated greatly through the
- council on medical education hospital and other activities.
  5. The increased hospital facilities by reason of Hill-Burton funds and local activities.
- 6. Continuing study and promotion of sound prepayment insurance programs and indigent care programs through the varions activities of the council on medical service.

#### PROFESSIONAL RELATIONS

There has been a lot of discussion and innumerable articles have been published in lay and medical journals concerning the knotty problem of proper relationship between doctors and between doctors and their patients. The American College of Surgeons, both in its own publications and in the lay press, have been denouncing such unethical practices as ghost surgery, fee splitting, overcharging and unnecessary surgery. Certain groups among the doctors have advocated the adoption of regulations permitting a modified form of fee splitting. At the present time, the code of ethics of the American Medical Association prohibits fee splitting in any form whatsoever. The present controversy has been concerned with whether or not these matters should be aired in the public press or whether they should be settled within the limits of medical organizations. The A.M.A. has adopted the general position that we should work within our own organization to the greatest extent possible to improve the ethical quality of service. Support has been given to the formation of mediation committees, the practice of discussion of fees before services rendered, the promotion of general good business practices, and the discouragement of charging of exorbitant fees. The A.M.A., of course, is also actively supporting the new Hospital Accreditation Commission which is dedicated to improving the quality of services in hospitals throughout the country.

It is also to be noted that throughout the country and especially in the smaller communities, a great many new hospital and other medical facilities have been constructed. It now becomes It now becomes the duty of the organized profession to see that proper use is made of such facilities and this is largely concerned with the proper ethical conduct of the physician or physicians working in

such facilities.

This report represents a very brief summary of some of the major problems which your American Medical Association is trying to deal with in a manner which will promote the general welfare and the good of the medical profession.

W. A. WRIGHT, M.D., Delegate

#### Medical Center Advisory Council (1954)

The North Dakota medical school has made progress during the past year. The new dean, Dr. T. H. Harwood, is ing his ability as an administrator and also as a public relations man for the school. He has added several members to the faculty, which is no small accomplishment in itself because of the shortage of qualified teachers in the basic sciences. He has visited most of the district medical societies in the state and has also been active with lay groups. These contacts will be of great value to the school because, through them, members of the profession and the laity will learn something of the problems confronting the medical school.

The new addition to the medical science building has been completed. The building is sufficiently large to accommodate all of the departments, the North Dakota Health Department laboratory, and a new library with adequate space for a reading room and for the voluminous current medical literature.

The medical clerkship program which was inaugurated last year proved to be a great success. Hospitals, clinics, and doctors in Grand Forks, Devils Lake, Dickinson, Bismarck, Fargo, Jamesin Grand Forks, Devils Lake, Dickinson, Bismarck, Fargo, Jamestown, Minot, Rugby, Williston, and Ellendale participated in the work. Plans are being completed now for the clerkship program for the present sophomore class. This plan of instruction has great merit because it gives the student an opportunity to devote full time to the study of the patient, in the doctor's office or in the hospital. It also gives him some idea of the private practice of readiging. Benorte from several who took the clerkship course nospitat. It also gives initiating the control of the clerkship course last year indicate that it was of great help to them in their junior year.

Strange as it may seem, less than 40 qualified North Dakota residents had sought entrance to the beginning class for the term opening next September, as of February 20, 1954. For this reason, the school has decided to admit a limited number of qualified out-of-state students. This is quite a departure from past policy. This decrease in the number of qualified applicants is not peculiar to North Dakota. Surveys elsewhere indicate the same trend, which is probably due to a number of factors. Whatever

the cause, it would seem highly advisable that publicity he given throughout the state, not only through the doctors but also among the laity, that North Dakota hovs and girls who are qualified will have little difficulty gaining admittance to the North Dakota medical school.

According to senate hill 184, which was passed in the 1953 session of the legislature, the third year course in medicine at the Center shall be established not later than 1955 and the fourthyear course not later than 1956. This poses a great problem for the medical school faculty, the university administration, and the state board of higher education. The main obstacles to the fulfillment of this legislative mandate were discussed in the report of your representative on the medical center advisory council last year. Nothing has happened since to change the picture. In recognition of the seriousness of the situation, the medical center advisory council passed the following resolution on June 16, 1953: "Whereas by the terms of senate bill 184 of the 1953 legislature the board of higher education is directed to retain a sufficient of the council the extendistion of the council the case of the ca fillment of this legislative mandate were discussed in the report

cient portion of medical center funds to permit the establishment of a third-year course in medicine not later than 1955, and a

fourth year course not later than 1956, and

Whereas in order to constitute a proper foundation for a third and fourth year course in medicine, a fully accredited two-year course is an absolute necessity, and
Whereas there is grave doubt as to the sufficiency of the in-

come of the medical center to provide for the necessary expense of operating the two-year school and in addition to accumulate the amount required for the third- and fourth-year courses within the time specified, and

Whereas it is not the understanding of this council that the legislature intended that the two-year medical school and the program for the coordination and advancement of the state health activities now under way at the medical center should be cur-

Now, therefore, he it resolved, that the medical center advisory council recommends that the existing two-year medical school and the health programs now in operation be maintained and carried out, as previously established and planned; that no new projects be undertaken or new construction contracted for, and that all ircome beyond the amount necessary for the maintenance of existing programs he carefully accumulated and held in compliance with said act, and

Be it further resolved, that we recommend that the board make careful investigations and plans and do all within its power looking toward compliance with said act and that it be prepared to present to the 1955 legislative session a complete report as to available funds and requirements for the establishment of said third- and fourth-year medical courses."

It is imperative that an agreement be reached soon between the university administration, the medical center, the state board of higher education, and the state medical association on a statement of policy which will command unified support. This will require a careful and unemotional appraisal of the situation hy all concerned. Politics must not be allowed to influence the decision. If complete agreement can be reached, it should be given publicity in the processory where the public part of the processory was the public part of the processory where the processory was the public part of the processor was the public part of the processor was the public part of the processor was the processor was the public part of the processor was the public part of the processor was t If complete agreement can be reached, it should be given publicity in the press and over the radio, and qualified representatives of the signatories thereto should appear before the committees at the 1955 session of the legislature and present the case. The state of North Dakota cannot afford to allow misinformed individuals, including politicians, to force a program on the state, within a given date, which may jeopardize the standing of the present two-year school. The North Dakota State Medical Association has consistently pursued a conservative policy with respect to the establishment of a four-year medical school in the state. It should reaffirm its policy and inform all interested paragraphs. state. It should reaffirm its policy and inform all interested parties that it is willing and ready to cooperate in a sane appraisal of the situation and the defense of the conclusions drawn from fac-

L, W. LARSON, M.D., Member

#### Report on American Medical Education Foundation

I am glad to report that North Dakota doubled its donation to the American Medical Education Foundation in 1953. In each of the years 1951 and 1952, 13 of our 385 members opened their purses to support our medical schools, a sum amounting to around \$1,000 each year. Last year 37 members raised that sum to \$2,177. Our own medical school received through this fund a grant of \$9,285.

For the first time in its three years' history the foundation topped the million mark. Illinois led the state standings due to the introduction of the Illinois plan whereby the House of Delegates to the Illinois State Medical Society voted a blanket increase of \$20 per memher in state dues which were turned over to the foundation. Utah has recently followed the example set by Illinois. The American Medical Association each year votes a grant of \$500,000 to the foundation.

About \$5,000,000 has been distributed to the nation's medical schools through the grants made by the National Fund for Medical Education. The doctors, together with the grant from the A.M.A. have contributed approximately 50 per cent of this sum.

Recent decisions handed down by the supreme court of the state of New Jersey have removed obstacles standing in the way of corporations that wish to make donations to education. The goal of the medical profession is \$2,000,000 and it is believed that American business and industry will produce willingly contributions necessary to meet and relieve the financial problems of our medical schools.

The women's auxiliaries have done a magnificent job donating \$34,704 to the American Medical Education Foundation during 1953. Many of these donations were obtained by sponsoring par-

ties and benefits.

The Audio-Digest Foundation has been formed in California. This new foundation will offer physicians a new type of service enabling them to obtain tape recorded abstracts of current medical literature, lectures, and panel discussions. This is a nonprofit corporation sponsored and owned by the California Medical Association and all proceeds accrued from the distribution of the tapes will be earmarked by the California Medical Association to the American Medical Education Foundation. The basic service of the Audio-Digest Foundation is the weekly issuance of a one-hour tape for general practitioners on which are recorded from 20 to 30 abstracts of the best in current medical literature. All articles are screened by a board of medical editors. Monthly digests in the fields of surgery, internal medicine, and obstetrics and gyue-cology will be available. The third service includes tape recorded lectures and panel discussions on one-hour reels for individual or

group purchase, Many of the lectures are illustrated by film strips made from the speaker's own slides.

The American Medical Education Foundation deserves the support of every physician in the United States. It has one purpose - giving financial assistance to our institutions of medical education. It is a well-known fact that a medical student does not pay the full cost of his medical education. A substantial part of the cost must come from a general fund of the parent university. Therefore, it behooves all members of the medical profession to remember their obligation to the school where they received their medical training and to contribute financially each year in proportion to their means. If every member of the medical profession will resolve to make a contribution this year, the foundation will more than meet its quota during 1954.

In North Dakota last year 11 members made donations of \$100 apiece. Two members donated \$200 apiece, Tbink what we could accomplish if each of us shared our responsibility and

donated but \$25 apiece.

You make a living by what you get; You make a life by what you give. W. E. G. LANCASTER, M.D., Chairman

Speaker Dodds next asked for a motion to refer the reports of the standing committee, except the report of the committee on medical economics and its subcommittees, to the reference committee to consider these reports. Dr. Pederson made the motion, seconded by Dr. Peters, that the reading of these reports be dispensed with and referred to reference committee, No. 3. The motion carried and the reports were referred to Dr. Sorenson, chairman of reference committe, No. 3.

The motion was next made by Dr. Vandergon, seconded by Dr. Jacobson that the report of the committee on medical economics and its subcommittees be referred to the proper reference committee, No. 4. The motion carried and these reports were referred to reference committee, No. 4, Dr. C. H. Peters, chairman.

A suggestion was next made by Dr. Sorenson, as chairman of the committee to consider the reports of the standing committees, that inasmuch as the report of the committee on medical education was so very like the report of the member of the medical center advisory council, that perhaps reference committee No. 2 should also take the report of the committee on medical education for consideration. This suggestion was accepted by Dr. Pederson, chairman of committee No. 2, and inasmuch as there was no objection from the house, this was carried.

#### Committee on Official Publication

Your committee begs leave to report that there is no cause for complaint. Everyone is apparently satisfied with the present arrangement as to The Journal-Lancet.

P. G. ARZT, M.D., Chairman

#### Committee on Crippled Children

I wish to report on the meeting of the committee on crippled

children of the North Dakota State Medical Association held at the Gardner Hotel in Fargo on January 30, 1954. In addition to myself, the other members present were Drs. J. C. Swanson, B. A. Mazur, R. B. Tudor, and A. E. Culmer. Mr. Lyle Limond was present and acted as secretary. Also present were Dr. Paul L. Johnson, acting medical director of the crippled children's services, and Mr. T. N. Tangedahl, director of crippled children's

The minutes of the last meeting of this committee on December 13, 1952 were read and approved. Dr. Pray opened the discussion of the status of the committee on crippled children and its relation to the crippled children's services. For the last few years this committee has served in an advisory capacity to the crippled childern's services, and this arrangement has appeared to satisfactory in every respect. However, this year Dr. Paul Johnson appointed a separate committee to act as an advisory committee to the crippled children's services; this committee consists of members of the North Dakota State Medical Association and includes one member who is supposed to act as liaison officer to the North Dakota State Medical Association. This member is Dr. E. T. Keller of Rugby. Several other members of the committee are members of the committee on crippled children; namely, Drs. Swanson, Fortin, and Tudor.

It was the opinion of Dr. Pray that the most important function of the committee on crippled children is to advise and consult with the crippled children's services, and that there is no need or reason for setting up a separate committee. Dr. Johnson of the crippled children's services said that the separate committee was instituted in accordance with the practice in some other states. Some of the members of this committee felt that this arrangement was satisfactory and that the committee on crippled children could act as a committee to give general recommenda-

tions to the state medical association only.

Dr. Paul Johnson felt that the program of the crippled childien's services is not adequately understood by the majority of physicians in the state of North Dakota. A resolution was passed that memhers of this committee take it upon themselves to advise the component county societies of the functions and status of the crippled children's services.

It was also moved and seconded that the committee on crippled children recommend to the state medical association that help be obtained through henevolent organizations such as the Elks Cluh for the purpose of securing possible financial aid for children suffering from rheumatic heart disease and possibly other crippling conditions. This was passed unanimously. The crippled children's services do not give help for rheumatic heart disease which was the reason this help from outside sources is

The meeting was adjourned at 11:30 a.m.

L. G. PRAY, M.D., Chairman

#### Committee on Necrology and Medical History (1954)

So live, that when thy summons comes to join The innumerable caravan that moves To the pale realms of shade, where each shall take His chamber in the silent halls of death, Thou go not, like the quarry slave at night, Seourged to his dungeon, but, sustained and soothed By an unfaltering trust, approach thy grave Like one who wraps the drapery of his couch About him, and lies down to pleasant dreams. WILLIAM CULLEN BRYANT

F. W. FERGUSSON, M.D.

Dr. Fred W. Fergusson, Lodi, California, long-time physician at Kulm, North Dakota, and brother of Dr. C. O. Fergusson, Jamestown dentist, died September 5, 1953 at Lodi, where he had lived since retiring.

Born at Drayton, North Dakota, June 20, 1892, he received his

pre-medical education at North Dakota, June 20, 1892, he received his pre-medical education at North Dakota University and was graduated in medicine from Northwestern University in 1918.

After a year of internship at Michael Reese Hospital, Chicago, he settled in Starkweather, North Dakota in 1919, practicing there two years and going to Kulm in November 1921, where he resided and practiced until 1951 when he moved to Lodi, California where he was the internal procession. formia, where he went into practice.

He was active in the affairs of the North Dakota State Med-

ical Association for many years and in 1941-1942 was honored by heing elected to the presidency. He also served as a member of the state board of medical examiners during the years 1943-1946. In July of 1946 he was honored in an appreciation day in Kulm. He was the first president of the Kulm Lions Club; had served on the city council and on the board of education. He also served as health officer of Kulm and of LaMoure county.

He married Laura Jane Johnston on June 22, 1920. Besides Mrs. Fergusson, he leaves a daughter, Mrs. John (Jean Victoria) Hohson, Newport, R. I., and three hrothers, Dr. Victor Fergusson, physician at Edgeley, North Dakota; Dr. C. O. Fergusson, dentist at Jamestown; and Harold Fergusson of Drayton.

#### A. P. HORSMAN, M.D.

Dr. A. P. Horsman, 90, an early physician in Devils Lake, passed away January 28, 1954 at Cambria, Wisconsin.

Dr. Horsman had gone to Cambria four years previously with his sister-in-law, Mrs. Ann Horsman. They bad formerly lived in Dunseith. Dr. Horsman moved to Dunseith after his retirement in 1946.

Born October 15, I863 in England, Dr. Horsman emigrated to Brantford, Ont., as a child. He graduated from the University of Cincinnati at the age of 23 and came to Devils Lake the same

A brother then operated a drug store at Churchs Ferry in which Dr. Horsman was associated. On his retirement, he sold the Horsman block in which he had maintained his office.

Dr. Horsman became a member of the Devils Lake District Medical Society in 1903. He was president of the local society in Devils Lake in 1906. He was a member of the Masonic Lodge in Devils Lake.

Survivors, in addition to his sister-in-law, are a sister, Emily Craddock, and a brother, Frank Horsman, both of Brantford, and several nephews and nieces.

#### C. J. MEREDITH, M.D.

Dr. C. J. Meredith, 57, who had practiced medicine in Valley City for 25 years, died September 20, 1953 at the University Hospital in Minneapolis after a long illness.

Dr. Meredith was born October 8, 1895 at Glenboro, Manitoba, Canada. He graduated from the University of Manitoba Medical School in 1921, following service with the medical corps of the Canadian Army in World War 1. He served an internship at Winnipeg General Hospital and later conducted postgraduate surgery there.

He became a naturalized citizen of the United States in September, 1923 and in 1925 moved to Marion, North Dakota, where he practiced medicine until 1928, when he entered practice in Valley City in November of that year. He retired from active

practice in January 1953.

He was married to Grace Broadfoot on February 19, 1926 at Winnipeg. She survives, together with one son, Dr. Donald C. Meredith, Glendale, Mo.; a sister, Anne (Mrs. M. J. Sharpe), Detroit; and two hrothers, A. W. Meredith, Glenhoro, Manitoba; and W. J. Meredith, Winnipeg.

A director of the First National Bank, Dr. Meredith was also

a member of the board of education, and served on the recrea-

tion council.

He was a fellow of the American College of Surgeons, a councillor of the North Dakota State Medical Association, and a member of the American Medical Association. For the past fourteen years he was secretary of the Sheyenne Valley Medical Association and a member of the Mercy Hospitai staff. He served as a mem-ber of the Congregational Church Council. His interest in youth is attested by his serving as a councillor for the Red River Valley City Boy Scout Council. He was a memher of the Elks Club and the Athletic Club. An ardent sportsman, he was interested in hunting, fishing, basketball, football, baseball, and golf.

At a special session of the hoard of education, a resolution of condolences was adopted. The hoard also established a C. J. Meredith Memorial Fund to be held in trust by the board to be

used for student henefit as directed.

Dr. Meredith's service to the North Dakota State Medical Association has been invaluable. He attended meetings of the council even though he was ill when many of the sessions were held. His loss is keenly felt.

#### ARTHUR A. NICHOLS, M.D.

Dr. Nichols, 69, Fargo physician for many years, died March 29, 1954. He was a hrother of Dr. William C. Nichols, associated with the Fargo Clinic. Dr. Nichols had been bospitalized for some time.

Arthur Alburtus Nichols was born in Fargo on May 26, 1884, his father, George Edmond Nichols, baving come to Fargo in 1878. His father organized the Cass County Abstract and Guaranty

Company and served four years as Cass County treasurer and

four years as state treasurer. Following his graduation from Fargo High School, Dr. Nichols Louis, graduating in 1906. After his graduation he came direct to Fargo and was with St. John's Hospital for a short time, and then set up his practice at Fargo. He served as city health officer

since 1946. A resolution in tribute to Dr. Arthur A. Nichols was adopted by the Fargo City Commission. The resolution says Dr. Nichols 'established a record of excellent service to his city as city health officer and has been an example of the finest in public service

for which its people may well be proud, and gratefully we inscribe this short tribute to his memory to stand upon our records."

He was a member of Gethsemane Catbedral parish and of Nu

Fraternity.

Surviving in addition to his brother are Mrs. Nichols, the former Edith Barry; a son, George A. Nichols, a chemist in Chicago; and a daughter, Mrs. E. Verle (Marvel) Deach, Minne-

#### MARTIN WILLIAM ROAN, M.D.

Dr. M. W. Roan, 74, pioneer North Dakota surgeon, died September 6, 1953 in a Bismarck hospital, where he had been

a patient since August 13.

Dr. Roan had practiced medicine in Bismarck from 1906 until s retirement in 1947. He and the late Dr. F. B. Strauss were his retirement in the founders of the Roan and Strauss Clinic, now known as the Missouri Valley Clinic.

A native of Rock Rapids, Iowa, Dr. Roan was born May 14, 1879. He received his early education in Iowa and Nebraska schools. He was graduated from Northwestern University at Evanston, Illinois, with a B.S. degree and in 1903, received his M.D. degree from Marquette University at Milwaukee, Wisconsin.

Abigail Patterson and Dr. Roan were married in Chicago on August 26, 1907. They returned to Bismarck after their marriage and made their home here until going to Europe, where Dr. Roan did postgraduate work at Vienna and Heidelberg in 1910 and 1911. He also did postgraduate work at Rush Medical School in Chicago and Johns Hopkins in Baltimore.

For 41 years, with the exception of time spent in the Army and in Eastern and European schools, Dr. Roan was active in the Bismarck community and a leader in North Dakota medical circles. He was a lifetime member of the American Medical Association and in June of 1953, the North Dakota State Medical Association presented him with a medal for fifty years of medical service. At the time of his retirement, Dr. Roan was chief of staff at the St. Alexius Hospital.

In addition to holding memberships in the North Dakota and American Medical Associations, Dr. Roan was a member of the Sixth District Medical Society, the College of Surgeons and Rail Sixth District Medical Society, the College of Surgeons and Rail Surgeons. In Masonic circles, he was a member of the Bismarck Blue Lodge, the Scottish Rite, the Mandau Indian Shriners, and the Sojourners. He was a charter member of the Bismarck Elks Lodge, a member of the Bismarck Lions, and the American Legion. A member of the U. S. Army Medical Reserve, Dr. Roan served in the first World War and was discharged with the rank of major. At the time of his death, he was a colonel in the re-

He is survived by his widow; two sisters, Marion and Katheryn Roan, both of Auburn, California; and three grandsons. One sister and two brothers preceded him in death.

#### ANDREW M. THOMPSON, M.D.

Dr. A. M. Thompson was born at Loyalton, South Dakota, on October 29, 1889. He passed away at his home in Wahpeton, North Dakota, January 24, 1954.

Dr. Thompson spent most of his childhood in Angar, Iowa, later coming with his parents to Havana, North Dakota, where they

lived on a farm.

lived on a farm.

His primary schooling was had at Havana Public School where he graduated from high school. He obtained his B.A. degree from St. Olaf College at Northfield, Minnesota, after which he entered military service. He spent two years as a physician's medical aid in the army in World War I.

Upon returning from service in 1919, he married Thea Sathe of Havana. They moved to Grand Forks, North Dakota, where he attended the University of North Dakota Medical School for two years. His medical courses were carried on at Northwestern

two years. His medical courses were carried on at Northwestern University Medical School at Chicago, Illinois, where he received

his M.D. degree in 1925.

He began his practice at Havana, North Dakota, but moved within one year to Abercrombie, North Dakota, where he practiced for about five years. Coming to Wahpeton, North Dakota, in 1931, he practiced there until his death in January of this

For nearly thirteen years, Dr. Thompson served as official doctor at the North Dakota State School of Science. He was a member of the local American Legion, and was chef de gare of the Forty and Eight. He was a memher of the Bethel Lutheran church of Wahpeton. His medical affiliations consisted of memberships of both the North and South Dakota state medical associations. He was a member of the First District Medical Society in North Dako'a and was president of the staff of the St. Francis Hospital in Breckenridge, Minnesota.

#### FRANK E. WEED, M.D.

Death claimed the life of Dr. F. E. Weed, 65, prominent Park River physician-surgeon and civic leader on March 9, 1954.

Born at Grand Forks on October 31, 1888, Frank Elmer Weed was the only child of a pioneer Walsh county couple, the late Mr. and Mrs. Dar Weed of Conway. He received his M.D. degree at the University of Minnesota in 1912 and was one of the first interns at the University Hosnital in Minneapolis. The same year he passed both the North Dakota and Minnesota State Medical Boards.

Opening his practice in Lankin, Dr. Weed remained there until 1915 when he moved to Park River. That same year he married Hortense Spain of Minneapolis. The couple has lived here since,

except for the time Dr. Weed was in the army during World War I. He served in the medical corps and held the rank of lieutenant when discharged.

A member of the North Dakota State Medical Association, Dr. Weed belonged to the International College of Surgeons and attended its convention in Rio de Janeiro in 1950. At the time of his death, he was a member of the State Board of Medical Examiners, of the American Association of Railway Surgeous, the

Examiners, of the American Association of Railway Surgeous, the Minnesota Medical Foundation, and the Grand Forks District Medical Society, heing a past-president of the last named group.

Besides Mrs. Weed, survivors include their four daughters, Mrs. Earl Fritz of Waterville, Minnesota; Mrs. J. Neiva de Figueredo of Rio de Janeiro; Mrs. Roy B. Harvey of Minneapolis; and Mrs.

Olaf Assand, Grafton.

F. 1. DARROW, M.D., and E. H. BOERTH, M.n., Co-Chairmen

#### Public Heatlh

A meeting of the committee on public health, State Medical Association, was held December 23, 1953, in the office of the state health officer. The following were in attendance: Drs. Russell O. Saxvik, chairman, Jamestown; P. L. Owens, Bismarck; and A. F. Hammargren, Harvey.

Also in attendance were: Dr. Carl Potthoff, National Foundation for Infantile Paralysis; James Fenelon, National Foundation tion for Infantile Paralysis; James Fenelon, National Foundation for Infantile Paralysis, Fargo; Jerome H. Svore, director of Public Health, Bismarck; Kenneth Mosser, state department of health, Bismarck; Hal Neugebauer, state department of health, Fargo; Dr. John Cartwright, Bismarck; Dr. L. W. Larson, Bismarck; Dr. Robert Tudor, Bismarck; Dr. W. B. Armstrong, Fargo; Dr. M. H. Poindexter, Fargo; and Mr. Lyle Limond, executive secretary, North Dakota State Medical Association.

The meeting was called for the primary purpose of reviewing with Dr. Potthoff the possibility of certain areas in North Dakota cooperating in the field trial using Dr. Salk's polio vaccine. Dr. Potthoff reviewed in detail the history of the vaccine and the plans for its nationwide use in an experimental vaccination of

from 500,000 to 1,000,000 second grade children.

Polio case record statistics were presented to the group for the major population areas of the state covering the last six years. These data indicated that the cases per 100,000 were the greatest for Cass county with the other areas in the following sequence: Burleigh-Morton, Ward, Stutsman-Barnes, and Grand Forks.

Dr. Tudor recommended that the vaccinc be accepted from the foundation and administered through the state health department wi'h the reservation that it be clearly stated that the doctors are protected by the foundation insofar as the vaccine is concerned.

It was unanimously approved.

Dr. Owens moved that the group recommend to the foundation that Cass county and Burleigh-Morton county be recommended as counties for the field trial of this vaccine. If further vaccine is available, Ward county should be included as third, Stutsman-Barnes as fourth, and Grand Forks as fifth. This motion carried.

It was further recommended that there be no charge on the part of the physicians for their services and that the entire matter be presented to the council of the state medical association on January 30, 1954.

R. O. SAXVIK, M.D., Chairman

#### Committee on Medical Education

The committee on medical education met at a dinner meeting in the Gladstone Hotel in Jamestown on Saturday, February 20, 1954 at 6:30 p.m.

Members present were: Drs. H. M. Berg, chairman, Bismarck; Tom Pederson, Jamestown; P. H. Woutat, Grand Forks; W. A. Wright, Williston; F. D. Naegeli, Minot; W. E. G. Lancaster, Fargo; R. F. Gilliland, Dickinson; Ralph Leigh, Grand Forks; and L Henry Kermott, Minot.

Others present were: Drs. Joseph Sorkness, Jamestown; John Elsworth, Jamestown; John Freeman, Jamestown; R. O. Saxvik, Jamestown; Paul Christenson, Jamestown; R. D. Nierling, Jamestown; T. H. Harwood, Grand Forks; R. C. Turner, Grand Forks; Lee Christoferson, Fargo; and Mr. Lyle A. Limond, Bis-

marck.

Dr. T. H. Harwood, dean of the medical school at the University of North Dakota in Grand Forks was asked the question 'Is a four-year medical school feasible for North Dakota?" Dr. Harwood answered:

1. It is a difficult question to answer.

2. There is much work to he done, much planning needed, and many obstacles to overcome before a fourth year can be added.

3. Clinical teaching is a vital necessity in medical education today. (a) There is not a sufficient concentration of patients in Grand Forks or any other area in the state. (b) Hospital facilities for teaching needed in Grand Forks.

4. Additional departments to be added which would provide services not available elsewhere in the state: (a) thoracic surgery, (b) cardiac surgery, (c) neurology, and (d) neurosurgery. 5. Four additional full-time heads of departments would be needed – medicine, surgery, pediatrics, and obstetrics and gynecology.

6. Present one-mill devy does not bring enough money for a four-year school. (a) At least twice the present two-year amount

of \$550,000 would be needed.

7. At present, the funds from the utill levy are designed to support the medical center, which has in addition to the medical school, other responsibilities. These include: (a) education for medical technicians, (b) funds for the dental association, (c) funds for nursing education, and (d) support of the blood bank.

Dr. Harwood next explained the present situation in regard

to admissions to the medical school.

I. Not enough qualified North Dakota boys and girls are applying.

2. Good grades are still essential for admission.

 There is a need for a good counselling program for high school seniors and entering freshmen at the university. The dean hopes to inaugurate such a program.

4. Twenty-five North Dakotans have qualified for admission at

this time

Along with admissions, Dean Harwood mentioned the status of transfers to other medical schools for the last two years of medical education.

1. Transfers are at present going along smoothly.

2. Transfers are always easy for the most part if admission

requirements are kept high.

3. A student, upon transfer, pays about \$1,000 tuition in most medical schools. There is a growing tendency among schools to raise their tuition to the full cost of such education in state-supported schools. The cost per student per year at most medical schools is about \$2,500.

4. The Dean again stressed the need for good grades by stating that the transfer problems always occur if the student is in the

lower half of the class.

Dean Harwood stated that the plans for the clerkship program are underway for 1954. We are planning well ahead of time with the physicians and clinics involved, the program we feel is desirable. Full directions and suggestions are being sent to the participating physicians and clinics.

Dean Harwood felt that the committee on medical education of the North Dakota State Medical Association could aid in tell-

ing the true story of the medical school.

The committee on medical education of the North Dakota State Medical Association went on record in commending Dean Harwood for his efforts in telling the true story of medical education in North Dakota at the district medical societies and hefore several lay groups in North Dakota.

H. M. BERG, M.D., Chairman

#### Committee on Fractures

While there has not heen a formal meeting of this committee, I have communicated with all the members of the committee and have received answers from two. Some suggestions might be made for consideration of future fracture committees, one of which is the suggestion of the committee that future fracture committees might compile a catalog of medico-legal cases involving fractures which might be of considerable value to the association. This catalog might be kept at the association headquarters for the use of individuals who are interested in the medico-legal aspects of fractures or are themselves the recipient of a malpractice suit.

It has been suggested to the chairman of the committee that the name of this group might he changed to a committee on trauma to include not just fractures but other conditions that

would come under this heading.

One of the committee members feels that it might be well to check on the use of hip prostheses and other surgical procedures in the open reduction of fractures. This committee member states, "I often have people come in complaining of fixation about the joint and pain following internal fixation, and now we are getting quite a few nailed hips which have not heen properly done and there is secondary aseptic necrosis, nonunion, and osteoarthritis requiring prosthetic surgical procedures."

A meeting of this fracture committee might be held at the time of the state meeting, and I am waiting for further advice

from the members of my committee.

PERCY L. OWENS, M.D., Chairman

#### Committee on Maternal and Child Welfare

The committee on maternal and child welfare of the North Dakota State Medical Association met in Jamestown on March 20, 1954. The committee submits the following for consideration:

1. This committee urges the appointment of a maternal mortality survey committee as previously proposed by the state obstetrical and gynecological society. This committee may he appointed either by the committee on maternal and child welfare or the obstetrical and gynecological society. All maternal deaths in the state of North Dakota should be reported promptly to the chairman of this committee by the Bureau of Vital Statistics, after

which an investigator is to review the case with the doctor, hospital, and amising staff in an effort to determine the cause of the maternal death. The investigator's report will then be presented to the maternal mortality survey committee for review at the regular biannual meeting. This material may then be prepared in such a manner as to be useful in seminars or district society medical meetings.

2. This committee recognizes a need for raising funds to assist in paying hospital and medical expenses of rheumatic heart patients who are unable to pay themselves or obtain financial aid from other sources. Perhaps some benevolent organization would take this fund raising as one of their charitable acts.

3. This committee approves the use of the polio vaccine, wherever and whenever possible.

4. The committee favors the use of penicillin or other suitable antibiotics as a substitute for silver nitrate in the prophylactic treatment of the eyes of the newborn.

ROBERT E. LUCY, M.D., Chairman

#### Committee on Cancer

The memhers of the cancer committee of the North Dakota State Medical Association are also members of the board of directors of the North Dakota Cancer Society, and although a formal meeting has not been held, 6 discussions have been conducted as members of the executive committee and board of directors of the North Dakota Cancer Society. These two groups are practically synonymous and as all activity appears to emanate from the North Dakota Cancer Society, we present this as a combined report of these two organizations:

Nationally, a vigorous campaign is being conducted urging all males age 45 and over to have periodic chest x-rays every six months or at least every year. The committee on cancer makes no comment regarding the publicity given to smoking versus cancer, hut we do repeat the statistics given to us. "Cancer of the lung is eight to one more common in males than in females, and of the males with cancer of the lung, the smokers predominate over the nonsmokers." In the last decade, cancer of the lung among men has increased from 6,600 to 17,400. The American Cancer Society in January 1952 initiated a research study on smoking habits that hy 1956 should produce a definite answer as to the question of whether smoking is an important factor in the sensational growth of lung cancer in this country. At present, 5 per cent of lung cancers are salvaged. This could be increased to 50 per cent hy more frequent examinations.

The Cancer Caravan for 1954 conducted a symposium on "Carcinoma of the Colon." Guest speakers this year were: Drs. John R. Hodgson, radiologist, Mayo Clinic; Jack Freidman, radiologist, Mount Sinai Hospital, Minneapolis; O. H. Beahrs, surgeon, Mayo Clinic; and Lyle Hay, chief surgeon, Veterans Hospital, Minneapolis. Discussions were conducted at Williston, Minot, Devils Lake, Fargo, Grand Forks, Valley City, Jamestown, Bismarck, and Dickinson. In addition, two innovations were presented. The mobile chest x-ray unit was offered to the public for free chest x-rays and a medical panel was conducted in the afternoon, at which time questions were presented by the public and answered hy the local doctors and the guest speakers. The continued fine response to our caravan encourages us to conduct his type of program for the husy North Dakota doctors annually.

Nationally, about \$8,000,000 a year is being spent on medical research hy voluntary organizations. Of this amount, about \$5,000,000 is heing spent by the American Cancer Society. In North Dakota to date, approximately \$90,000 has been given as grants-in-aids to research. Unless medical research can find fur-ther preventatives or cures for cancer, no less than 22 million Americans now living will die of cancer. Cancer is killing about 225,000 Americans every year. Cancer research, dealing as it 225,000 Americans every year. Canter research, dealing as a does with growth processes of cells, is aiming at a remote and difficult target; knowledge of which is almost indistinguishable from the secret of life itself. We are happy that we in North Dakota are able to contribute to this type of medical research. During the past year, \$4,000 has heen granted to the North Da-kota Agricultural College School of Pharmacy to continue re-search work started in January 1953. The work, under the direc-tion of Dr. C. E. Miller, chairman of the pharmaceutical chemistry department, has as its goal the developing of more efficient compounds than the presently used drug, "Urethan." During the first year of the project, a number of new organic compounds containing nitrogen and sulphur were synthesized by Dr. Miller and Mr. Addlebert Knevel. These derivatives were subjected to screening for effectiveness as anticarcinogenic agents using tissues known to have the leucosis virus complex. As a result of this work, three of the new compounds which showed the most promise are to be further evaluated by the Sloan-Kettering Institute for Cancer Research in New York City. In addition, a \$10,000 grant was given to the University of North Dakota to continue the research problem of Dr. Fisher of the department of bacteriology which commenced in 1952.

Because of Dr. Leonard W. Larson's important contributions to the control of cancer, not only in North Dakota, but to Region

V and the American Cancer Society, the North Dakota Cancer Society nominated him for the 1953 Bronze Medal for distinguished service in cancer control. The beautiful medal and citation were presented to Dr. Larson during the final meeting of the Cancer Caravan at Bismarck, April 9, 1954. Dr. Larson has served the cancer society in many capacities: chiarman of the board of directors and executive committee of the North Dakota Cancer Society, vice-chairman of the board of directors of the American Cancer Society, and chairman of Medical and Scientific Committee. Each of the fifteen years since his first appointment to the cancer committee of the state medical association, he served on one or more of the important committees. Dr. Larson, due to his busy schedule, had to refuse the presidency of the American Cancer Society several years ago. Nationally, the American Cancer Society's 1953 award for scientific achievement was awarded Dr. Charles Brenton Huggins of the University of Chicago Scientists, for his research in hormones. His genius was recognized and remembered in 1940 when he demonstrated that many hopeless cases of prostatic cancer could be improved dramatically and for long periods by removing the testes and administering female hormones. This was the first great proof that inoperable cancer could be controlled. Three years ago he was acclaimed for showting that removal of both adrenal glands helped many women with advanced breast cancer and a few of those men whose prostatic cancer was not arrested by castration.

Due to several requests, the committee on cancer is considering the possibility, practicability, and feasibility of recommending that the North Dakota Cancer Society purchase radium which would be available free of charge to the North Dakota doctors. Several phases must be considered thoroughly before this recommendation is given. We must find a suitable place for storage, and also we must he assured that those who handle radium are qualified in every respect so that no harm either to the patient or doctor will result. A survey is being conducted by your chairman throughout the state of North Dakota and this topic will be discussed with the various medical societies and if a majority feel that this plan is practical, this procedure will be recommended to the board of directors of the North Dakota Cancer Society

sometime in the future.

We welcome to North Dakota the addition of Mr. Jim Blozie, a recent graduate of the University of Indiana, as field representative for the North Dakota Cancer Society. Mr. Blozie, a native of Connecticut, has recently assumed this position and has been conducting area conferences throughout the state and especially in counties which heretofore have heen poorly organized. Mr. Blozie is fast becoming a typical westerner and already fine

results are following in his footsteps.

The cancer organization in North Dakota is growing and we urge all doctors to not only contribute in membership, hut to give their helping hand when they are approached by their county commanders for an occasional talk on a cancer program in their respective area. A short comment by a doctor carries far more weight than by anyone else in a community. No preparation is needed for this type of program as a general knowledge that any

general practitioner has on the subject of diagnosis and treatment of cancer would be sufficient and impressive.

We want to thank all of the doctors who in the past have given their time for this worthy project. Urging a patient to come to his doctor early means early diagnosis and the saving of more lives. Just a glance at the following statistics will emphasize this point. At the present time, 30 per cent of uterine cancers are saved, this can be increased to 70 per cent; 35 per cent of hreast cancers can be increased to 75 per cent; 15 per cent of rectal cancer can he increased to 70 per cent; 35 per cent of mouth cancer can be increased to 65 per cent; 85 per cent of skin cancers (which is very commendable) can be increased to 95 per cent. This is our goal.

CARROLL M. LUND, M.D., Chairman

#### Committee on Public Policy and Legislation

I wish at this time, first, to state that there has been no meeting of this committee during the past year. The activity of this committee will become an imporant factor this summer and fall prior to the meeting of the legislature which occurs January I, 1955.

There are many problems that face this committee. First, shall the North Dakota State Medical Association take any active stand and he prepared to meet any ultimatum which may he put to them through the legislators this coming January I, relative to the institution of third and fourth medical years into the medical school at the University of North Dakota.

Shall we, as a society, enter into any of the dehate which at present is currently being carried on hy the American Physician's Association and the A.M.A., relative to President Eisenhower's new health program? A comprehensive report has heen sent to our secretary, Mr. Limond, from Dr. A. R. Gilsdorf, who attended the meeting of the Midwest Conference on Veteran's Medical Care, sponsored by the committee on federal medical services of the council of medical services of the A.M.A. at Hotel Pakston, Omaha, Nebraska. I trust that you all will read this report and

be guided accordingly. This is a legislative problem and will ultimately come to the attention of the committee on public policy and legislation.

The final thing that this committee is faced with is the question of whether we are or are not going to organize the North Dakota State Medical Association into equitable legislative districts for efficiency and for the purpose of being able to meet any and all legislation on the "spur of the moment" if and when such should be instituted at the coming legislature. This should be done soon and preferably the meeting should be arranged so that the institution of such a program could be initiated at the coming state medical convention, May 1.

O. W. Jounson, M.D., Chairman

#### Committee on Medical Economics

The committee on medical economics spent a conscientious and successful year in its work, and the results of that work have paid off for we now have a satisfactory fee schedule with the state welfare board. This is now in effect and is uniform for all the doctors in this state.

We started our task in August of 1953 when a suh-committee censisting of Drs. R. W. Rodgers of Dickinson, E. J. Larson of Jamestown; and Ted Keller of Rugby, met with Ralph M. Atkins, director, division of public assistance, of the state welfare board, to iron out our misunderstandings and to better appreciate each other's problems. There were three of these meetings in the fall of 1953, and we were finally told to suhmit a fee schedule to them for their consideration.

The entire medical economics committee then met at the Quain & Ramstad Clinic in Bismarck on November 14, 1953, and spent most of that night in drawing up and revising our new fee schedule.

schedule.

On the morning of December 16, 1953, this schedule was submitted to the state welfare hoard at their meeting and was adopted by them. Dr. R. W. Rodgers and Mr. Lyle Limond attended this meeting and helped sell the issue to them.

On January 30, 1954, our medical association council met and

adopted the schedule for our state memhers,

Then began a series of meetings throughout the state where memhers of our profession met with welfare boards, explained the schedule to them, and did a marvelous piece of work selling the schedule on a local level. These meetings started after February 1, 1954, and were held at Bismarck, Fargo, Jamestown, Minot, Devils Lake, Grand Forks, and Williston.

During the first part of March 1954 this new schedule was sent out to the doctors of the state and is now in full force and acceptable hy the welfare boards. We are proud of this accomplishment and I want to thank the members of the committee who worked on the schedule and the many doctors throughout the state who attended the meetings of the local welfare boards to heln sell our schedule to them.

The committee on medical economics is meeting with Mr. Earl Ahrahamson, secretary of the North Dakota high school league to work out a suitable plan and fee schedule with that group at 10:30 a.m. on Sunday, May 2, 1954.

TED KELLER, M.D., Chairman

#### SUB-COMMITTEE ON MEDICAL PREPAYMENT PLAN

Across the state, one occasionally hears rumblings of discontent toward the Blue Shield Plan. The feeling seems to prevail that the Blue Shield Plan is formulated and directed by a lay group. Nothing is further away from the truth than this presumption. Every participating physician has a voice in the management of the plan; the executive secretary and his staff merely carry out the wishes of the governing board.

Repeated calls for meetings of the board of directors of the Blue Shield Plan have resulted in a bare quorum. If the doctors are not interested in the control and regulation of payments in their own health plan, why should a special suh-committee he set up to do what the doctors themselves are failing to do? It is for this reason that no special meeting of the committee has been

called

The chief complaint fostered on the Blue Shield is that the fees are not high enough. Everyone knows that the premium dollar stretches only so far. If the remuncration to the doctors is to he increased, the premium rate will have to be raised. The sales force can soon tell you at what level it becomes almost impossible to sell policies. If doctors want to price themselves out of the Blue Shield market, why not have them attend the meetings and vote accordingly.

The next chief complaint is in regard to the service feature of the Blue Shield Plan. Only under the principle of service henefits at minimum cost does the nonprofit plan have a reason for being. Salvation of our health services, and thus of other enterprises, from final government control can be achieved through nonprofit plans employing the method of service benefits. This salvation is possible through the service benefit method because of the nature of its operation. Doctors and hospitals are here brought into direct contractual relationship in terms of services with the people who use these services.

It was my hope that the annual meeting of the Blue Shield could have been held before the meeting of the State House of Delegates; conflicts in time made this impossible so the annual meeting of the Blue Shield will be called at 4:00 p.m. on May 2. Everyone will have a chance to be heard, but I urge all to thoroughly study the plan as it now exists, try to visualize what contemplated changes will do, and then present their ideas for consideration of the board.

O. A. Sedlak, M.D., Chairman

#### SUB-COMMITTEE ON RURAL HEALTH

The committee on rural health held one meeting, at Jamestown, on Saturday, August 22, 1953. The following members were present: Drs. M. S. Jacobson, chairman, Elgin; Joseph Sorkness, Jamestown; W. A. Wright, Williston; R. O. Saxvik, Jamestown; W. R. Fox, Rugby; Clarence Martin, Kensal; K. G. Vandergon, Portland; S. C. Bacheller, Enderlin; and Mr. Lyle A. Limond, Bismarck.

This meeting was devoted to preparing a program for the rural

health meeting to be held at Dickinson.

The rural health committee held a joint program with the North Dakota Public Health Association at Dickinson, October 26-27, 1953. The following program was presented: Martin Altenberg, extension service 4-II Club leader; Grace DeLong, state home demonstration leader, "Health Work of the Homemakers Club." A. C. Berg, county commissioner, Maddock, N. D., "The Club." A. C. Berg, county commissioner, Maddock, N. D., "The Role of the County Commissioner in the Rural Health Committee;" Dr. R. O. Saxvik, superintendent, State Mental Hospital, Jamestown, "Mental Health."

Your chairman attended the regional Rural Health Conference at Denver, Colorado, on November 11-12, 1953. This was a very interesting and informative meeting. Subjects of discussion were the medical budget by Blue Cross members; The Akron, Colorado, Jug Program on how to interest girls in your community in nursing; a typical county health survey; and the use and abuse of the

country doctor.

Your chairman was unable to attend the National Rural Health Conference at Dallas, Texas, on March 4-6, 1954. Dr. W. A. Wright attended this meeting and he informs us it was an ex-

ceptionally good meeting.

Your chairman is now working with the Grant County Health Council to work out a survey which will be carried out this coming year. This survey will attempt to obtain information regarding: immunization; sewage disposal, culinary water supply; rheumatic fever; diabetes; mothers and babies, prenatal and post-natal care; milk supply—raw milk—pasteurized milk; brucellosis; tuberculosis; and carcinoma.

No further work has been done on the rural hospital survey. Probably in two years, further information can be obtained.

Your committee will be unable to hold a joint program with the Public Health Association this coming year. The program that has been presented in the past has not reached the people that we are interested in. Some other approach will have to be used to contact more people in the various counties.

M. S. JACOBSON, M.D., Chairman

#### VETERANS MEDICAL SERVICE

The following is a report from the chairman of the sub-committee on veterans medical service to the committee on medical economics and to the house of delegates.

The committee had no formal meeting during the past year. However, the chairman is quite familiar with the activities of the

veterans medical division.

This agency has been in operation for eight years. The office continues to be on a cash basis in that the monthly expenses are reimbursed in full by the Veterans Administration; the accounts are audited by the Veterans Administration.

The office still has a loan of \$2,500 from the state medical association, but as we mentioned in the report last year, this amount of money is equalled by funds in the circulating bank account and in the possession of furniture and fixtures in the

During 1953, there were 1,962 authorizations handled by the office, which is 61 less than in 1952. However, the average amount of each authorization is \$16.24, which is \$1.34 per

authorization more than in 1952.

The total amount of fees transmitted by this office to doctors in 1953 was \$26,633, which is \$2,286.50 less than in 1952. cooperation of the physicians in general is good and reports in most instances are coming in somewhat more rapidly after the completion of the examination. We must, however, continue to ask that all physicians in the plan submit reports promptly and be certain to complete the certifications required by the Veterans Administration.

Our relationship with the Veterans Administration continues to be cordial and satisfactory.

Mrs. Anita Meisner continues to operate the office efficiently.

The committee recommends continued operation of the plan as it is in effect at the present time and asks for the continued cooperation of the physicians.

R. B. RADL, M.D., Chairman

#### NEW BUSINESS

The first order of business was the introduction by Speaker Dodds of Mr. O. S. Trom, Lisbon, North Dakota, chairman of the committee on inter-allied professional council of the Pharmaceutical Association of North Dakota. Mr. Trom spoke as follows:

"On behalf of 400 pharmacists in the state of North Dakota, let me express our thanks for giving us this opportunity of meeting with you today. We have in our pharmaceutical association a committee on inter-allied professional relations, of which I am chairman this year; but I am sorry to report that little or nothing has been done about it for many years. We are, therefore, glad of this opportunity, which is long overdue, to get together where we might offer a few suggestions leading to a better understanding between our two great professions, and we sincerely hope

that your association will reciprocate.

"Physicians and pharmacists in this state have enjoyed a very close relationship for many years, and it is only natural for us to hope that this may continue. Then why are we here? We hope to have a simple explanation to that question. No doubt you have your problems, the same as we have ours. So our answer to that question is simply this: existing problems are so closely associated with the medical profession that they have become a matter of concern not only to our group, but to your own group, so much so, that a wholehearted spirit of cooperation

between the two professions is the only approach to a solution.
"We, as pharmacists, are by no means perfect in the administration of our duties to the physicians and to the public. We are making some progress in eliminating a few of our shortcomings. We are aware of the criticism directed at us by the medical profession. We are aware of the fact that counterprescribing is wrong, and that there is too much conversation, sometimes, with the pathen there is too make constraints, which has pa-tient concerning the medication he is receiving. We are aware, also, that only the physician is qualified to say whether a prescription should be refilled, and that it is a serious offense to sell legend drugs over the counter. There are other criticisms, too, that are justified, but as 1 said, 1 believe we are making progress. We have known for a long time that physicians have had legitimate grievances, but not until 1953 when the National Association of Retail Druggists made a study of this matter, did we realize that the condition existed throughout the entire country. And so, steps were taken at once to rectify the situation.
"Now, I should like to discuss very briefly a few points affect-

ing not only our two professions, but which could easily become

"1. Prescription pricing. No doubt every physician has had the subject of prescription prices brought to his attention at some time or other. This is a very natural question for anyone to bring up. I state that the Public Relations Manual of the American Medical Association urges physicians to be frank in the discussions of medical costs with patients. It is emphasized that explanations should extend further than the fee of the doctor. We think the advice is excellent, but we wish to inject a suggestion. Now and then patients protest prices on prescriptions and insist that the physician had told them what the price would be. Hence, the suggestion we have to offer is this: that estimates of medical costs submitted to the patients be broad instead of specific. Through experience, we have learned that patients appreciate very much being told that certain medications may run into considerable money, but that the results in most cases more than offset the

"2. Federal and state regulations that impose restriction on the pharmacist. A heavy responsibility rests on the pharmacist on this point and we ask the cooperation of every physician in the state in order that we may stay within the law. At times we may think some of these regulations are rather foolish and unnecessary, but they have been placed on the books for one purpose, and that is the welfare of the public. We ask you to refresh your memories, particularly with regard to the writing of prescriptions for nar-cotics, barbiturates, and legend drugs. Most prescription blanks today will give us all the information we want, provided certain

notations are made.

Prescriptions for proprietaries. Several state associations, through their professional relations committee, have requested their physicians to give patients written prescriptions for proprietarics, when indicated, rather than oral instructions to 'go to your local drug store and get a certain over-the-counter drug.' There are drug store and get a certain over-the-counter drug.' several reasons for this. First, the issuance of oral orders for medicines is very dangerous hecause there are too many chances for misunderstandings. Second, it promotes self-medication, and third, psychology enters into the picture. A written prescription for even a proprietary carries with it a certain prestige, and it is our profession as well as the medical profession to maintain high ethical standards.

"4. Patients' choice of physician and pharmacist. In your fight

to stave off socialized medicine, in the state legislature several vears ago, one of the big factors entering into the fight was the inherent right of a man to call on the physician of his choice. Our stand on this right is the same and since pharmacy in the state of North Dakota aided in this fight, we believe that same

man should have the choice of his pharmacist.

"5. Physician-owned clinic pharmacies. This is a subject of deep concern to the pharmacists of North Dakota, particularly where these physician-owned clinic pharmacies are now in operation. We feel that there is only one justification for physicians to operate pharmacy facilities. It is the welfare of the patient. Such justification is rare today; in fact just about nonexistent, Pharmacists in our state, we believe, provide excellent services for the patients of the physicians. We believe that most of the physicians stand with us in opposition to encroachments on the profession of pharmacy, and that they recognize the valuable services of the pharmacists. The physicians and the pharmacists enjoy the highest respect of their community, each in his own sphere.

So let us keep it that way.

"Finally, on behalf of the pharmacists of the state, we sincerely urge this convention to pass a resolution placing your organization on record as supporting section 6, chapter 1, of the Principles of Medical Ethics. This highly significant state of ownthe American Medical Association, and with your permission

"Section 6, chapter 1 of the Principles provides that 'an ethical physician does not engage in harter or trade in the appliances, devices, or remedies prescribed for patients, but limits the sources of his professional income to professional services for the patient.' The council has ruled that it is unethical for a physician to have a financial interest in a pharmacy in the area in which he conducts his professional activities and where he profits directly or indirectly from the sale of devices or remedies prescribed for the patient. This is particularly true when the services of other reppatient. This is particularly true when the services of other reputable pharmacies are readily available. Along with the problem of ownership of pharmacies by doctors may be considered the question of rental of space to a pharmacist in a clinic or office huilding owned or leased by physicians. When physicians rent such space on a sliding scale, or for a percentage of the income received by the pharmacy, the result is equivalent to receiving a relate from the prescription and is therefore used to the pharmacy. a rebate from the prescription and is, therefore, unethical. The Principles of Medical Ethics of the American Medical Association provides the basis on which are predicated all principles of medical ethics which are utilized to guide the activities of physicians. The fact that a physician is a member of a specialty group or of a constituent association where special interpretation of ethical principles has been provided does not release him from his obligation to comply with the *Principles* of *Medical Ethics* of the American Medical Association. There have been instances where a state association or a specialty organization has announced an interpretation of a segment of the Principles of Medical Ethics which is definitely contrary to that adopted by the American Medical Association. The judicial council wishes to emphasize that the only method by which the *Principles of Medical Ethics* may be altered requires the formal presentation of a resolution to the house of delegates of the A.M.A. embodying an amendment to the *Principles of Medical Ethics*."

#### RESOLUTION

Whereas, the first obligation of physicians is to diagnose and prescribe medication, drugs, and devices for the treatment of his

Whereas, section 6, chapter 1 of the Principles of Medical Ethics of the American Medical Association provides that "An ethical physician does not engage in barter or trade in the appliances, devices or remedies prescribed for patients, but limits the sources of his professional income to professional services ren-dered his patient;" and

Whereas, the judicial council of the American Medical Association has ruled that it is unethical for a physician to have a financial interest in a pharmacy in the area in which he conducts his professional activities and where he profits directly or indirectly from the sale of drugs, remedies, and devices prescribed for the patient, and where the services of other reputable pharmacies are readily available; and

Whereas, there now exist various situations in North Dakota wherein a physician or a group of physicians have a pecuniary interest in the pharmaceutical function, either by direct or indirect ownership or through rentals; and

Whereas, various violations of section 6, chapter 1 of the Principles of Medical Ethics of the American Medical Association now exist in the state of North Dakota;

Now, therefore, be it resolved: that the North Dakota State Medical Association in its sixty-seventh annual session duly assemheld does hereby resolve and express its adherence to section 6, chapter 1 of the *Principles of Medical Ethics* adopted by the American Medical Association, which Principles provide that an ethical physician does not engage in barter or trade in the applications of the principles pliances, devices, or remedies prescribed for patients, but limits the sources of his professional income to professional services rendered the patient.

"Please do not misunderstand me or the suggestions we have tried to make. We fully realize that by no stretch of the imagination can these be applied to all the physicians in the state, because do have wonderful cooperation from the majority. simply striving to make for a better understanding, and we trust that you will in turn help us do our part better for you and the public. We would ask you too, when the proper time comes, to appoint one or more members of your group to act with members of the other allied groups as a permanent committee to study problems as they concern us all,

"In conclusion, may we thank you again for this opportunity to come before you, and may we hope that this is only the hegin-ning of a bigger and better inter-allied professional relationship between our two great professions. I have been authorized to present to you an invitation for a representative or representatives of your society to be present as our guests at our annual North Dakota Pharmaceutical Association Convention in Jamestown in June on the 13th, 14th and 15th. We shall be happy to have you with us."

Speaker Dodds then thanked Mr. Trom for appearing before the house of delegates and stated that his suggestions would be referred to the appropriate committee and action taken subsequently. The resolution was referred to Dr. Saxvik, chairman of the committee on

A resolution given to the secretary by Dr. Haugrud, together with a communication having to do with crippled children and another from the North Dakota Society of Obstetrics and Gynecology, were referred to committee No. 3, Dr. Sorenson, chairman.

The next order of business to come before the house was the matter of fixing the per capita ducs for the coming year. The council considered the problem and asked Dr. Nierling to present the recommendation made by them to the house for consideration. Dr. Nierling stated that a good deal of time was spent on the formulation of a budget for the coming year. The amount of the budget is gradually increasing and for the past two or three years, the association has had a deficit. The amount of this deficit has been the subject of much consideration by the council, and the feeling is that it should be reduced or eliminated as quickly as possible. The only way this can be done is to either increase the dues of the members of the association or to charge a fee for the banquet and the "mixer" at the convention, which heretofore has been paid by the association, or do both these things. The budget as presently set, amounts to some \$22,000 and the increase over last year's budget is about \$2,000. The raise was due largely to the feeling that our executive secretary should have an increase in salary. It was felt that he had done a remarkable job and that he deserved it. Second, the raise in the budget has been partially caused by increases in rent and expenses incident to the operation of the state office in Bismarck. The council, after considering these expenditures, concluded that it be recommended to the house of delegates that the yearly dues be increased and the amount considered by the council would be an increase of from \$50 to \$75 per year.

Following a short discussion on the subject, Dr. Nierling continued with the statement that the deficit from the convention last year was only around \$200. There was a time when this deficit was \$1,300. The past year, a \$5 registration fee was charged to take care of some of the expenses. There are about 360 members at \$50 per member, which comes to \$18,000. We are running about \$4,500 in the red, providing all of this budget is spent. There are a few items in the budget, such as a \$3,000 allowance for the committee on public policy and legislation which never has been fully used. About \$750 was used last year, so actually, there was a good \$2,250 of that which was not spent. There are a few other allowances which we do not spend entirely, but which we feel should be in the budget because they may be spent. This year it is felt that the committee on public policy and legislation should have an allowance of \$3,000 because of the legislative year coming up and there will be more expense this year than last year. By charging the additional dues, a total of approximately \$27,000 would be collected, and with the budget as it stands, we should have a fairly good balance in the black instead of in the red.

The speaker then asked for any questions the members of the house might like to ask Dr. Nierling.

Dr. Sorenson stated that he personally felt it was right to raise the dues, but questioned the effect it would have on the membership. This was answered by Dr. Sedlak, who recalled that the membership did not reduce substantially when the dues were raised to \$50.

Dr. Pederson stated that it was becoming increasingly evident that the members of the association were going to have to put forth extra effort and perhaps monetary sacrifice. He then made a motion that the house of delegates accept the recommendation of the council to increase the present dues to \$75 per year. This was seconded by Dr. Vandergon. Motion carried and the dues are now increased to \$75 per year.

Speaker Dodds next asked for the reading of the members of the nominating committee as appointed by the president. Dr. Boerth responded as follows: The following have been appointed to the nominating committee: Drs. C. J. Glaspel, M. S. Jacobson, and Thomas

Pederson.

Dr. Radl was next introduced by Speaker Dodds, with the following suggestion:

"The Council has asked me to convey to the House of Delegates a Resolution disapproving Senate Bill 3114 and HR 8356

which has to do with government reinsurance plans.

"I have another resolution to do with the revision of the constitution. This concerns an addition to article IV of the constitution regarding the 'Composition of the Association.' This refers to allowing residents in hospitals and/or clinics to become members of the component medical society and the state association without paying ducs, or paying minimum dues. This should be considered, as it is to their advantage to belong to the component medical society and it could be of practical importance to them and their families. As I understand it, unless a physician is a member of the component medical society, he is not eligible to become insured in the North Dakota State Medical approved Health and Accident program. It would also increase the number of men paying premiums into the Health and Accident Disability Program."

Speaker Dodds referred both of the above suggestions to the committee on resolutions, mentioning the fact that the last suggestion would really be an amendment and it would have to come up at the next Annual Meeting

for adoption.

Dr. Youngs was next introduced by Speaker Dodds

with the following presentation:

"I have been working with a committee that was appointed to study a change in the council. We have 8 members on the council, of which 6 are required to have a quorum. There have been meetings in the past at which it has been difficult to get a quorum present. The committee was appointed to study ways and means by which it would be easier to obtain a quorum of the council at any one time. There are a total of 10 societies in the state, Eight of them have council representation and 2 smaller societies do not at the present time; namely, Kotana and Traill-Steele. This committee is recommending that these 2 small active societies have council representation. We also recommend that the immediate past president be appointed to the council, as a councillor-at-large, giving a total of 11 councillors, and the requirement of 6, or a majority of the 11 to constitute a quorum."

ment of 6, or a majority of the 11 to constitute a quorum."

Speaker Dodds noted that this would be a proposed change in the constitution so that it would be necessary, if such a change was approved, to bring it up for consideration at the next annual session. Dr. Sandmeyer moved, and Dr. Craven, seconded, that the recommendation of Dr. Youngs and his committee to enlarge the

council, be accepted. Motion was carried.

Dr. Nierling then asked that the immediate past-president be elected for a term of one year. The question was put before the house and carried, to be considered at the annual session in 1955 for adoption.

Dr. Youngs next made a further proposal:

"I have a proposed change in the by-laws which has to do with the house of delegates. This is chapter 4, section 2 of the by-laws. Due to consolidation of component societies and shift in membership during the past years, the composition of the house of delegates has changed until in 1953 there were only 16 delegates and an equal number of alternates. Due to the increasing activity of the various committees of the state association and an increasing number of committees and transactions of the council and activity of the officers, the amount of work required of the house of delegates at each session has been multiplied. It has reached the point where during the last two years, the small number of delegates were required to do too much work in too short a time. Some have felt that some method of increasing the representation in the house of delegates would be advisable. In accordance with this, the following changes in the by-laws are suggested: chapter 4, section 2, By-Laws. Proposed change to read: 'Each component society shall be entitled to send to the house of delegates each year, one delegate for every fifteen (15) members, and one for each major fraction thereof.' Proposed change in chapter 12, section 9, line 5: 'substitute 15 for 25.'"

Speaker Dodds stated that this represents a change in the By-Laws and to effect such a change some member of the house must assume at this time the introduction of this amendment, so that it could be voted upon at the next session of the house.

Dr. Rodgers assumed the introduction of this amendment to the house of delegates to be brought up for a motion for adoption or rejection at the next session.

The Speaker next requested the chairmen of the various reference committees as to the time and place of their committee meetings. Each chairman then stated the required information.

Dr. Peters next stated a resolution which had been forwarded to the executive secretary's office. This was in regard to the displaced physician and his relationship to the community in which he practices. This resolution stated that it was felt that the committee on displaced physicians should take a more active interest in the displaced physician and help to resolve any differences and misunderstandings between the displaced physician and his community in accordance to our present by-laws. This resolution was referred to Dr. Saxvik's committee on resolutions.

Dr. Fortney also presented a resolution as follows:

"This has to do with the part of the report of Dr. Wright, our delegate to the A.M.A., partially relating to osteopaths. I believe this creates a great number of problems and I think it would be pretty hard to work with osteopaths. I would like to present a resolution that we instruct our delegate to vote against the adoption of the recommendation made to the house of delegates of the A.M.A. that it be ethical for doctors of medicine to consult with and give instructions to osteopathists."

This resolution was referred to Dr. Saxvik, chairman of the committee on resolutions.

Discussion next followed as to the uniformity of membership in district medical societies of displaced physicians. It appears that in some societies in this state displaced physicians are eligible for membership, and in some other societies they are not. Speaker Dodds suggested to Dr. Saxvik that in considering the resolution on displaced physicians, some thought could be given to the matter of some uniformity of membership in district medical societies. Dr. Saxvik commented that he had received a communication regarding the attitude of the association on the Mental Health Association. It had been stated by the Mental Health Association that they would like to receive doctors into their association. Speaker Dodds asked that Dr. Saxvik's committee present a recommendation or a resolution to the house at the secend session.

#### Adjournment

It was moved and seconded that the first session of the house of delegates adjourn to reconvene at 1:00 p.m., Sunday afternoon.

#### SECOND SESSION, HOUSE OF DELEGATES Sunday Afternoon, May 2, 1954 Grand Forks, North Dakota

The second session of the house of delegates was called to order at 1:30 p.m., May 2, 1954 in the Dacotah Hotel, Grand Forks, North Dakota.

Dr. Haugrud, chairman of the credentials committee reported that there was a quorum present. Dr. Boerth

reported that there was a quorum present. Dr. Docturcalled the roll and the following doctors responded:
G. W. Toomey, Devils Lake; A. C. Fortney, Fargo; Earl Haugrud, Fargo; E. J. Beithon, Wahpeton; R. C. Painter, Grand Forks; A. C. Kohlmeyer, Larimore; John A. Sandmeyer, Grand Forks; W. C. Dailey, alternate, Grand Forks; J. D. Craven, Williston; A. R. Sorenson, Minot; G. M. Hart, Minot; G. Christianson, Valley City; C. J. Klein, alternate, Valley City; C. H. Peters, Bismarck; R. O. Saxvik, Jamestown; R. W. Rodgers, Dickinson; K. C. Vandergon, Portland. G. Vandergon, Portland.

The reading of the minutes of the first session was dispensed with upon motion of Dr. Rodgers, seconded by

Dr. Vandergon.

#### Selection of 1955 Meeting Place

Dr. Peters, as a delegate from the Sixth District Medical Society, extended the house an invitation to meet in Bismarck in 1955, and offered full cooperation. Dr. Sorenson, with pleasure, made the motion to accept this invitation, seconded by Dr. Haugrud. Motion carried and the invitation was accepted to hold the next meeting in Bismarck, North Dakota, on April 30, May 1, 2 and 3, 1955.

#### REPORTS OF REFERENCE COMMITTEES Reference Committee to Consider the Report of the President, Secretary and Special Committees

Dr. Rodgers, Chairman, presented the following reports and their discussions, which were adopted section by section, and as a whole.

1. Report of the President. Your reference committee has reviewed the report of the president. We especially note his comment regarding the Medical-Press-Radio Conference held in Jamestown, and we concur in his emphasis on the necessity for the promotion of this phase of public relations.

It is noted with gratification the intense interest and help given by our president to implement a better state

mental health program.

It has been evident that Dr. Sorkness has utilized his various committees and officers to the fullest extent. Your committee feels that Dr. Sorkness has done an outstanding job as president and suggests that the house of delegates give him a rising vote of thanks and commendation for his executive ability.

This portion of the report was adopted by the house of delegates giving a rising vote of thanks to Dr. Sorkness in appreciation of his services the past year.

2. Report of the Sceretary. The report of the secretary was thoroughly reviewed. We concur with the desirability of early reporting by the secretaries of component societies and the recommendation that membership dues be paid by January I. We commend him for a job excellently done. This portion of the report was adopted.

3. Report of the Executive Secretary. Your reference committee has reviewed the very detailed report of the prodigious activities of the executive secretary and his staff. We agree with our executive secretary that some committees have not been functioning to their fullest extent and deem it necessary that these committees be stimulated to perform their essential functions.

We considered his "thoughts for the future" and recommend that: (1) There be closer liaison between the executive secretary and the committee on rural health regarding the placement of physicians. (2) There be appointed 2 members to work on the inter-professional liaison committee on health, (3) There be inaugurated medical-public forums and a regional series of medicallegal conferences. (4) That consideration be given to depositing our reserve funds in securities offering more than 1 per cent interest. (5) That certificates be issued to members of this association who have secured eligibility for honorary membership.

We highly appreciate the amount of public relations work our executive secretary is accomplishing. This por-

tion of the report was adopted.

4. Report of the Committee on Emergency Medical Service. Your reference committee has reviewed the report of the committee on emergency medical scrvice, and have noted the recommendations of this committee. We recommend that they be given authority to formulate plans to cope with both military and natural disasters, and formulate plans to cooperate with local societies. This portion of the report was adopted.

5. Report of the Committee on Industrial Health. We endorse the recommendation of the committee on industrial health that plans be formulated to promote a farm safety program. This portion of the report was adopted.

6. Report of the Committee on Mental Health. The committee has reviewed the report of the committee on mental health and agrees in principle with all statements and recommendations in their report.

We recommend that all societies work for the passage of these laws in the next legislature. This portion of the

report was adopted.

Report of the committee on displaced physicians. We have noted the report of the committee on displaced physicians and recommend adoption of this report. This portion of the report was adopted.

8. Report of the committee on diabetes. The report of the committee on diabetes has been carefully reviewed and we wish to compliment them on their continued efforts in diabetic detection and public education. This portion of the report was adopted.

The motion was made by Dr. Rodgers and seconded by Dr. Haugrud that the report as a whole be adopted.

Motion carried.

R. W. Rodgers, M.D., Chairman JOHN A. SANDMEYER, M.D. K. G. Vandergon, M.D.

#### Reference Committee to Consider the Reports of the Standing Committees

Dr. A. R. Sorenson, chairman, presented the following report, which was adopted section by section and as a whole.

1. Report of the Committee on Neerology. It is with sadness that this reference committee in reviewing the report of the committee on necrology and medical history notes the loss by death of 7 members of the North Dakota State Medical Association. Several of them we have come to know intimately through their active participation in the affairs of this association, and we feel their loss keenly.

In memory of them, let us stand in silence for one moment as a showing of love and appreciation of the good they have done for those who remain. This adopts this portion of the report.

2. Report of the Committee on Official Publication. Your reference committee reviewed the report of the committee on official publication and move the adoption of this report. This portion of the report was adopted.

3. Report of the Committee on Crippled Children. Your committee has reviewed the report of the committee on crippled children. It was noted in this report a change made by the crippled children's services in appointing a separate committee to act as an advisory committee; whereas, previously, the crippled children's committee of the state association has performed this function. It has seemed that this is a duplication of the services which does not add any efficiency to the pro-

Also, your reference committee recommends that the state association give consideration to the development of a program for securing money from outside sources to give financial aid to childern suffering from rheumatic heart disease. This portion of the report was adopted.

4. Report of the Committee on Public Health. The report of the committee on public health is concerned with the program for the use of Dr. Salk's polio vaccine in the state of North Dakota. Where this vaccine was to be used was determined by the percentage incidence of polio in the various counties. These are listed in order as follows: Cass, Burleigh-Morton, Ward, Barnes-Stutsman, and Grand Forks, and the vaccine will be administered in this order. No charge is to be made by the administering doctors and protection as far as the vaceine is concerned is assumed by the National Foundation. This portion of the report was adopted.

5. Report of the Committee on Fractures. This committee has reviewed the report of the committee on fractures and moves the adoption of this portion of the report. This portion of the report was adopted.

6. Report of the Committee on Maternal and Child Welfare. Your committee has reviewed the report of the committee on maternal and child welfare and suggests that paragraph 1, on page 68 of the Handbook be discussed in open meeting of the house of delegates. This

paragraph is as follows:

"This committee urges the appointment of a maternal mortality survey committee as previously proposed by the State Obstetrical and Gynecological Society. This committee may be appointed either by the committee on maternal and child welfare or the obstetrical and gynecological society. All maternal deaths in the state of North Dakota should be reported promptly to the chairman of this committee by the Bureau of Vital Statistics, after which an investigator is to review the case with the doctor, hospital, and nursing staff in an effort to determine the cause of the maternal death. The investigator's report will then be presented to the maternal mortality survey committee for review at the regular biannual meeting. This material may then be prepared in such a manner as to be useful in seminars or district society medical meetings."

This portion of the report was adopted.

Speaker Dodds then noted that the chairman of the reference committee had asked for a discussion from the house, and asked if anyone cared to offer any comment.

Dr. Sorenson commented that as he understood the situation, the committee wishes to appoint a committee to work in conjunction with obstetrics and gynecology.

Speaker Dodds then stated that the thought behind it was that an investigation could be carried on as to the cause of maternal mortality and by so doing, they might eliminate the mortality. He instructed secretary Boerth to read a letter from the secretary of the North Dakota Society of Obstetrics and Gynecology

Secretary Boerth then read the following letter:

"The North Dakota Society of Obstetrics and Gynecology resolved on September 18, 1952, that, as a society of physicians interested in the welfare of the pregnant mother, any steps the society could take to enhance the safety of childbearing was of prime importance to us, to medicine in our state, and to the

community. The society further resolved to favor the establishment of a maternal mortality study, such program to be under the direction of the committee of maternal and child welfare of the North Dakota State Medical Association. This resolution was

reaffirmed on September 19, 1953.

"Since a study of this nature involves preparation, some expense and background investigations as to the most applicable method of conducting such a study, it is felt that the State Medical Society and the committee of maternal and child welfare be notified of the resolution but perhaps more important, be notified that the North Dakota Society of Obstetrics and Gynecology will cooperate and assume any responsibility or role in this program that the state medical association wishes to recommend.

"In all states where such programs are underway, the maternal mortality has been reduced. The physicians in such states are enthusiastic about the good the maternal mortality studies have done to elevate the practice of medicine in their communities. The established programs have gained the confidence of the medical profession individually and as a whole and there is no longer any fear regarding the confidential nature of these inves-

tigations.
"In spite of the existence of hurdles to overcome, the North Dakota Society of Obstetrics and Gynecology feels that there is enough merit in such a program, that it is willing to devote its efforts to the establishment and to the support of such a program. It is to be clearly understood that the role of the Society of Obstetrics and Gynecology in this program is to he none other than the implementation of the wishes and policies of the North Dakota State Medical Association as a whole

Respectfully submitted. JOHN S. GILLAM, M.D., Secretary-Treasurer, North Dakota Society of Obstetrics and Gynecology

Speaker Dodds then asked for a discussion on the above matter. Dr. Peters also asked for a discussion on program No. 4 of this same report of the committee on maternal and child welfare as also stated in the Handbook, as follows:

"The Committee favors the use of penicillin or other suitable antibiotics as a substitute for silver nitrate in the prophylactic treatment of the eyes of the newborn."

Dr. Beithon responded as follows:

"Silver nitrate is the accepted drug for treating the eyes of the newborn. A good many men have used penicillin. Just what the legal procedures are is hard to determine. I know of no place where this has come up regarding the use of something else hut silver nitrate in the eyes of a baby. I feel that the state association has no business adopting this portion of the report. The house of delegates, of course, can do as it wishes regarding this, but I think that a man who uses anything else but the accepted method is treading on dangerous ground.'

The motion was made for the approval of the report of the reference committee relative to the report of the committee on maternal and child welfare. The motion

was carried and this portion of the report was adopted.
7. Report of the Committee on Cancer. Your committee has reviewed the report of the committee on cancer and we believe that this committee has submitted a splendid detailed report on their activities in aiding the dissemination of knowledge concerning the diagnosis and treatment of cancer among the doctors and lay people of the state.

Dr. Carroll Lund, who has been so active in this movement and who has sacrificed so much time and given so much effort in promoting this movement, should have the wholehearted gratitude of this association. This is one of the more important activities of our association, and it will in the course of time bring forth good results. This portion of the report was adopted.

8. Report of the Committee on Public Policy and Legislation. The report of the committee on public policy and legislation stresses two problems which should have

the consideration of this house of delegates.

- 1. Shall we, as an association, take an active part in the controversy concerning the establishment of a fouryear medical school, which will come up in the next legislative session?
- 2. Shall we organize our association into legislative districts which will appoint a committee in each district to work for the best interests of the medical school?

Your reference committee suggests that Dr. O. W. Johnson, chairman of the committee on public policy and legislation present his thoughts on this subject. This portion of the report was adopted. It was moved by Dr. Sorenson, seconded by Dr. Vandergon, that the report as a whole be adopted. Motion carried.

A. R. Sorenson, M.D., Chairman R. C. Painter, M.D.

# Reference Committee to Consider the Reports of the Council, Councillors, Delegate to the A.M.A., and Member of the Medical Center Advisory Council, also the Committee on Medical Education

Dr. Toomey, acting chairman, presented the following report which was adopted section by section and as a whole:

1. Report of Chairman of the Council. Your reference committee reviewed the report of the chairman of the council, noting the attendance at the council meetings to be good, and that a great deal of work has been done.

Your reference committee notes a discussion relative to a newly proposed legislative setup in North Dakota, dividing the state into 49 legislative districts for the purpose of contacting legislators on the local level. Such a plan has been used in the past and found to be very effective. We recommend that such a plan be reinstituted.

The committee views with pleasure the administration of the \$500 scholarship fund for medical students at the University of North Dakota and strongly recommends continuation of the scholarship fund under its present excellent equitable administration.

Your reference committe heartily concurs with the necessity of carrying a \$20,000 surplus. However, we feel that these moneys could be invested at a better return them is contractly required from C. Roude.

than is currently received from G-Bonds.

We note with pleasure the continuing activities of the Physicians Placement Service in the office of the state association, but we recommend more lay publicity relative to the existence of such a service.

Your committe heartily endorses the cooperation of the state association with the National Polio Foundation and the local health departments in the conducting of recent immunization programs.

Your committee heartily recommends the continuation of Medical-Press-Radio-TV Conferences during the coming year. This portion of the report was adopted.

2. Reports of the Councillors. The committee reviewed the reports of the Councillors, which revealed a general excellency of programming and attendance. It is recommended that certain societies be encouraged to hold more frequent meetings. This portion of the report was adopted.

3. Report of the Delegate to the A.M.A. The committee reviewed the annual report of the delegate to the A.M.A. and compliments the delegate, Dr. W. A. Wright, on the large amount of work done and time expended on

his part in the interest of the state association.

Particularly noted is the dexterity with which he has condensed the large amount of material discussed at the national meeting; especially calling to the attention of the members of our association, the following: (1) federal legislation, (2) veterans affairs, (3) osteopathy, (4) public policy and professional relationship, and (5) professional relations.

We feel, specifically, that our state association should concur with the A.M.A. in its attitude towards reinsur-

ance of voluntary health programs.

Your committe unequivocably supports the A.M.A. and its code of ethics in prohibiting fee splitting in any form

whatsoever. This portion of the report was adopted.

4. Report of the Member of the Medical Center Advisory Council. Your committee reviewed the report of Dr. L. W. Larson, member of the medical center advisory council, and found the report to be an excellent summation of the present problem. Your committee heartily concurs with the summary in this report; namely: "The North Dakota State Medical Association has consistently pursued a conservative policy with respect to the establishment of a four-year medical school in the state. It should reaffirm its policy and inform all interested parties that it is willing and ready to cooperate in a sane appraisal of the situation and the defense of the conclusions drawn from factual data." This portion of the report was adopted.

5. Report of the Committee on Medical Education. Your committee, in reviewing the report of the committee on medical education, heartily commends Dean Harwood's frank analysis of the problems relative to a four-year medical school in North Dakota. This portion of the

report was adopted.

It was moved by Dr. Toomey, seconded by Dr. Sandmeyer, that the report as a whole be adopted. Motion carried.

G. W. Toomey, M.D., Acting Chairman C. J. Klein, M.D.

# Reference Committee to Consider the Reports of the Committee on Medical Economics and Its Sub-Committees

Dr. C. H. Peters, chairman, presented the following report, which was adopted section by section and as a whole.

1. Report of the Committee on Medical Economics. Your reference committee has reviewed the report of the committee on medical economics and wishes to highly commend the committee for its work in arriving at an equitable fee schedule with the state welfare board. Drs. R. W. Rodgers, Dickinson; E. J. Larson, Jamestown; and Ted Keller, Rugby, are especially commended for their diligent efforts in laying the groundwork for the revision of the fee schedule. Mr. Limond is commended as a liaison officer in this effort. Your reference committee feels that every county in the state should allow its indigents free choice of a physician. It is the wish of the chairman to have Dr. Kohlmeyer discuss this last statement. Dr. Kohlmeyer spoke as follows:

"It was brought to the attention of the committee that there are two counties at least, who hire a number of physicians as county physicians. There is no free choice in those counties by the patients. They are forced to go to the individual county physician. This is in contrast to practically every other section of the country. That is the situation as it now stands here. Grand Forks and Fargo are both included in that, and there has been a lot of discussion on that. We thought that we should mention it here."

This portion of the report was adopted.

2. Report of the Committee on Prepayment Medical Care. Your reference committee has reviewed the report of the sub-committee on prepayment medical care. Your reference committee feels that the committee's criticism of the deficiency in attendance of board meetings of the Blue Shield and the lack of interest is justified, and we feel that efforts should be made to encourage more active participation by the members of this board.

Your reference committee recognizes the possibility of pricing ourselves out of the Blue Shield market, and it is, of course, desirable that the cost of the plan be within the means of the average wage earner to subscribe. Nevertheless, we must recognize the newer economics of the times and the increased standard of living, which would

justify the increased premium cost.

It is recognized that there is a difference of opinion among the members of the association and among the

physicians participating in the Blue Shield plan regarding the maximum income range under which service benefits are granted to Blue Shield subscribers. We feel that this difference of opinion can be reconciled in the future with care and effort on the part of the sub-committee on prepayment medical care and the board of directors of Blue Shield.

Your reference committee suggests that the applicant's income bracket might be stated on the application form to facilitate determination of the insured's qualifications under a service plan. This portion of the report was

3. Report of the Sub-Committee on Rural Health. Your reference committee has reviewed the report of the sub-committee on rural health and wishes to commend the work done by this committee, and especially the work done by the chairman, Dr. M. S. Jacobson. Your committee has been informed that a rural hospital survey has been abandoned because the survey has been assumed by the state health department. The committee is to be encouraged in its efforts to reach rural people through farm organizations. This portion of the report was adopted.

4. Report of the Sub-Committee on Veterans Medical Service. Your reference committee has reviewed the report of the sub-committee on veterans medical service. The committee feels that the veterans service office is functioning well, and that diligent supervision is being maintained in its relationships with the physicians of the state, and complying with the veterans administration's

policies.

It is evident that there is a continued downward trend in the volume of cases handled. This portion of the report was adopted. It was moved by Dr. Peters and scconded by Dr. Sandmeyer that the report as a whole be adopted. Motion carried.

C. H. Peters, Md., Chairman A. C. Kohlmeyer, M.D. E. J. BEITHON, M.D. J. D. Craven, M.D.

#### Reference Committee on Resolutions

Dr. R. O. Saxvik presented the following report which was adopted section by section and as a whole.

#### RESOLUTION

Whereas the sixty-seventh annual meeting of the association being held in the city of Grand Forks has enjoyed the traditional

hospitality of that great city,

And whereas the mayor, the Grand Forks chamber of commerce, R. H. Jagd, chief of police, the several hotels, and a number of its citizens have assisted in making this session both en-

joyable and beneficial, Now, therefore, be it resolved that the house of delegates of the North Dakota State Medical Association express their appreciation by directing a copy of this resolution to Oscar Lunseth, mayor of the city of Grand Forks.

RESOLUTION

Whereas, O. S. Trom, chairman of the inter-allied professional council did appear before the house of delegates and presented suggestions leading to a better understanding between the medical and pharmaceutical professions,

And whereas his recommendations require the considered opin-

ion and study of our association.

Now, therefore, be it resolved that the house of delegates advise the president to appoint a committee to meet with the interallied professional council at a mutually agreed time with the purpose of establishing procedures leading to a better understanding between the two professions.

#### RESOLUTION

Whereas several displaced physicians have been practicing in the state for the past four years and in many cases have per-formed accredited service to their communities,

And whereas in several instances, communities and the dis-placed physicians have had differences leading towards misunderstanding and mistrust,

And whereas in certain instances the displaced physician is not, or can not be a member of the district medical society,

Now, therefore, be it resolved that the board of censors of the local district society act as the first echelon to resolve such dif-ferences between the displaced physician and his community in accordance to our present by-laws,

And be it further resolved that each district society afford the displaced physician the privilege of joining the district society with all the rights of a regular member.

#### RESOLUTION

Whereas the special committee on osteopathy of the American Medical Association has made the following recommendations to the house of delegates of the A.M.A., to wit: (1) that osteopathy no longer be considered a cult; and (2) that it be ethical for doctors of medicine to consult with and give instructions to osteo-

Now, therefore, be it resolved that the house of delegates of the North Dakota State Medical Association hereby record their opposition to this concept and instruct their delegate to vote against its

adoption.

#### RESOLUTION

Whereas, the North Dakota Mental Health Association is directing a campaign to acquaint this state with the requirements for establishing the state hospital as an accredited psychiatric hospital, as well as conducting educational programs to inform the public on other matters concerned with mental health,

And whereas the association is in need of considerable profes-

sional support and direction,

Now, therefore, be it resolved that the state medical association acknowledge their work hy encouraging our memhership to join the Mental Health Association and to actively participate in its effort to bring sound mental health programs to the state.

#### RESOLUTION

Whereas, the practice of radiology, pathology, and anesthesiol-

ogy is the practice of medicine, and

Whereas, the American Medical Association, the official radio-logical, pathological, and anesthesiological organizations, numerous courts of law, and many state and local medical societies have re-peatedly emphasized the fact, and,

Whereas these medical organizations and the courts of the land have clearly defined medical service and hospital service, and

Whereas the inclusion of radiological, pathological, anesthesio-logical, and other medical service benefits, in hospital service and commercial hospital insurance policies, implies that these services are hospital services rather than medical services, and further implies that the hospitals are engaged in the practice of medicine,

Whereas we do not believe that the hospitals wish to engage in the practice of medicine, and are, in fact, prohibited by law

from doing so, and

Whereas, many hospital service and commercial hospital insurance policies provide benefits for radiological, pathological, anesthesiological, and other medical services only if performed in a hospital "when rendered by a salaried employee of a hospital,"

Whereas, such provisions have resulted in many abuses and much unnecessary hospitalization, thereby, unnecessarily increasing the cost of such protection to the general public, and tend to encourage the practice of medicine and the employment of physicians by hospitals to the detriment of all concerned;

Now, therefore, he it resolved that the North Dakota State Medical Association approves and endorses the stand of the American Medical Association and the many other eminent medical organizations that the practice of radiology, pathology, and anesthesiol-

ogy is the practice of medicine, and Be it further resolved that the North Dakota State Medical Association opposes the inclusion of any medical services in hospital service and commercial hospital insurance contracts, and urges their transfer to, and future inclusion in medical service and insurance contracts in accordance with the principles and ethics of the American Medical Association.

#### RESOLUTION

Whereas the congress of the United States is considering Senate Bill 3114 and HR Bill 8356 - proposals for the subsidization

of voluntary health insurance plans, Now, therefore, he it resolved that the house of delegates of the North Dakota State Medical Association hereby record their op-position to these hills and instruct the secretary of this organization to send appropriate letters to our North Dakota congressmen.

Whereas the sixty-seventh annual meeting of the North Dakota State Medical Association has well received and profited by the educational scientific program so well organized by Dr. F. A. Hill

and his committee,

And whereas the Grand Forks District Medical Society, Dr. John H. Moore, general chairman, and the several program and entertainment committees served the state medical association in

its usual excellent manner,
Now, therefore, be it resolved that the house of delegates signify their grateful appreciation by a rising vote of tbanks.

All the members of the house rose for this final vote of thanks.

All resolutions were at this time unanimously passed

by the house of delegates.

Speaker Dodds next announced that the house would proceed with the old business. The proposed amendment to the By-Laws was again read by Dr. Boerth, as follows: "chapter 4, section 2 of the By-Laws. Proposed change to read: 'Each component society shall be entitled to send to the house of delegates each year, one delegate for every fifteen (15) members, and one for each major fraction thereof.' Proposed change in chapter 12, section 9, line 5: 'substitute 15 for 25.'"

It was moved by Dr. Sorenson, seconded by Dr. Sand-

meyer that this amendment be adopted.

Under the heading of old business, a discusson followed concerning the proposal of the joint meeting with the South Dakota State Medical Association, to be held in 1956. Following was a report of a committee, headed by Dr. Halliday, which was appointed to investigate the possibility of a joint meeting of the seventy-fifth year that South Dakota will be an organized state association. Mr. Limond met with the executive secretary of the South Dakota State Medical Association and following is his report:

<sup>2</sup> First, as to facilities: they have a very fine auditorium for the scientific program and plenty of exhibit space; 2 very fine modern hotels and both hotels have meeting rooms for councils and delegates; 8 motels – 4 definitely A-1; and a country club.

Cooperation has definitely been extended by the chamber of commerce, the local medical society, and the school system. The highways are in good repair and there is air service from Bismarck. By June 5, the public schools will be closed, allowing the auditorium to be fully utilized for the medical convention. This does not conflict with the A M A meeting in Chicago.

marck. By June 5, the public schools will be closed, allowing the auditorium to be fully utilized for the medical convention. This does not conflict with the A.M.A. meeting in Chicago.

Mr. Limond believes he can work with Mr. Foster in putting on the combined meeting. Mr. Foster, the executive secretary of the South Dakota State Medical Association, has 5 points he wishes to bring out. The preparation of the scientific program will have a joint committee of the 2 associations to meet in Bismarck to determine the type of program desired. A courtesy committee of local Aberdeen doctors would be arranged to meet guest speakers. Housing would be handled through the South Dakota executive secretary. For the social program, a joint committee could lay the plans to be carried out by either executive secretary. For the financial arrangements on a joint meeting, there would be an income of \$5,000. Some of the speakrs will be sponsored by health organizations. The banquet could be charged on an individual basis. If desirable, we could set up a separate bank account for the meeting. The scientific program would be a joint affair, but the business meetings would be separate. Aberdeen has adequate space for such meetings. It was the thought of the committee that we should accept the invitation to meet with them."

Dr. Wright spoke in favor of holding this joint meeting. He stated that people in South Dakota wish to have a closer association with the South Dakota and North Dakota medical men. Dr. Halliday will be president at that time, and is personally very much in favor of holding the meetings down there. He is a member of this committee that has done a lot of work and planning on this.

It was next moved by Dr. Peters and seconded by Dr. Pederson that the House accept the invitation as coequals to celebrate the Dakota Territory Medical Society Anniversary.

Dr. Sorenson offered as an amendment that a meeting of the house of delegates be held in the state of North Dakota, before the joint meeting in South Dakota. This

was seconded by Dr. Saxvik.

At a suggestion made by Dr. Radl that this motion should include a meeting of the council, Dr. Sorenson revised his motion to read that both the house of delegates and the council meet in the state of North Dakota, prior to the meeting in South Dakota. Dr. Saxvik again seconded the motion. The house voted first on the

amendment that the house of delegates and the council meet in North Dakota before the joint meeting in South Dakota, and the motion carried.

They next voted on the main motion; namely, that we accept the South Dakota invitation for a joint meeting in Aberdeen, South Dakota, June 2 to 5, 1956. The motion carried. Dr. Dodds, speaker of the house, noted at this time that the point of the meeting of the house of delegates and the council would have to be considered at the next annual meeting to be held in Bismarck.

The new business report was next given by Dr. Saxvik: "Your committee recommends approval of the following change in the constitution, article IV, section 3, 'Composition of the Association'— after 'in which said Teachers live' add 'Residents in graduate training may also be elected Association Members of the Component Society of the District in which said resident is taking his training.' The final sentence in the above-mentioned section, 'They shall be charged no dues.' A point of reference is made to By-Laws, chapter IX, Assessment and Expenditures, section 6, 'exceptions to the per capita annual assessments are the following: C—Members in graduate training without restrictions to the period of time involved shall be assessed \$10 per annum.'

The speaker was requested to open a discussion to resolve this conflict between the constitutional proposed amendment and the existing By-Laws as read.

Dr. Saxvik moved the adoption of this recommendation for an amendment to the constitution, and this was seconded by Dr. Vandergon. The motion was then open for debate.

DR. SAXYIK: "It seems to me that the only way you can amend the constitution and continue to allow this type of association members in the local societies, is also to amend Article C of the By-Laws. This article was passed to care for those regular members who left the state to go into resident training."

Speaker Dodds asked if Dr. Saxvik wished to amend that to read "Without any assessment"?

DR. SAXVIK: "No, I have not proposed this amendment. I do not know whether the associate members who have the privilege of participating in the district society should be eligible to pay the \$10 membership fee. The associate members only include the teachers in the medical school."

Speaker Dodds stated that if we wish to bring these in as associate members, the motion could only be accepted as of this date and it would have to be acted upon next year, to add to section 4. Two motions would be necessary; one, in the change in the constitution and the other a deletion in the By-Laws. This could not be acted upon at this time and would have to be taken up next year. This was favorable to Dr. Saxvik.

The proposed change in the constitution, article IV, section 3, was approved of unanimously for consideration at the next session.

The Chair next entertained a motion of deletion in the By-Laws.

Dr. Saxvik moved that we delete all of item C, section 6, chapter IX, Expenditures, "Members in graduate training without restrictions to the period of time involved shall be assessed \$10 per annum." This was seconded by Dr. Vandergon. This motion carried and will come up at the next session of the house of delegates in 1955.

A discussion followed between Dr. Sorenson and Dr. Gilsdorf as to the changing of the meeting date of the annual meeting. It was felt by Dr. Sorenson that by having the meeting at a later date, we would have more favorable weather and a greater attendance. Dr. Gilsdorf stated, however, that the first week-end in May was chosen so that it does not conflict with Mother's day and annual meetings held in other states. No further action was taken on this by the house.

Dr. Peters next proposed a motion that the registration fee of \$5 be deleted at the next meeting. He was requested to bring such a motion to the house by the conneil. This motion was seconded by Dr. Saxvik and motion carried by the house.

There being no further new business, the report of the nominating committee was read by Sccretary Boerth,

as follows:

President, P. H. Woutat; president-elect, D. J. Halliday; first vice-president, R. H. Waldschmidt; second vice-president, R. W. Rodgers; speaker, G. A. Dodds; vice-speaker, R. E. Leigh; secretary, E. H. Boerth; treasurer, E. J. Larson; delegate to A.M.A., W. A. Wright; alternate delegate, G. W. Toomey; councillor—4th district, A. D. McCannel; councillor—5th district, Walter Gilsdorf; board of medical examiners, John Fawcett, W. A. Wright; and R. O. Geeb! Wright, and R. O. Goehl.

The motion was made by Dr. Peters, seconded by Dr. Sandmeyer, that these nominations be accepted and that the officers be elected unanimously. This motion passed

with a unanimous vote.

Speaker Dodds then spoke as follows: "If there are no further discussions or business to come before the assoeiation, the chair would like to take this opportunity to thank the members of the house for their cooperation; and particularly the committee members for the effort they have expended on their reports."

The motion was made by Dr. Sandmeyer, seconded by Dr. Rodgers, that the seeond and final session of the house of delegates adjourn. The speaker declared this

session adjourned sine die.

#### SCIENTIFIC PROGRAM

Monday, May 3, 1954 Auditorium, Central High School

8:30 to 9:30 a.m.—Registration.

9:30 to 10:00 a.m.—"Current Concepts in Management of Ulcerative Lesions of the Stomach"—Dr. P. Roy Gregware, Bismarck, North Dakota.

10:00 to 10:30 a.m.—"The Nature and Management of Acute Renal Insufficiency"—Dr. Howard Odel, Mayo Clinic, Rochester, Minesota.

10:30 to 11:00 a.m.—Intermission.

11:00 to 11:30 a.m.—"Recent Trends in Dermatologic Therapy," -Dr. Frank Melton, Fargo, North Dakota.

11:30 to 12:00 a.m.—"Proctologic Diagnosis"—Dr. Robert Mc-Carty, Marquette University, Milwaukee, Wisconsin. 1:30 to 2:00 p.m.—"Emergencies in the Newborn Period,"—Dr.

Harry Medovy, University of Manitoba, Winnipeg, Canada.
2:00 to 2:30 p.m.—"Acute Hand Injuries"—Dr. A. F. Frackelton, Marquette University, Milwaukee, Wisconsin.

2:30 to 3:00 p.m.—Intermission.
3:00 to 3:30 p.m.—"Endocrine Problems in General Practice"—Dr. Frank Allan, Lahey Clinic, Boston, Massachusetts.

3:30 to 5:00 p.m.—Panel discussion: "Medical Emergencies." Moderator, Dr. A. C. Kerkhof, Minneapolis, Minnesota. Discussors, Dr. P. Roy Gregware, internist, Bismarck, North Dakota; and Dr. Milton Berg, Radiologist, Bismarck, North

#### Tuesday, May 4 Auditorium, Central High School

9:00 to 9:30 a.m.—"Experiences with Use of Radioactive Iodine"—Dr. Marshall Landa, Fargo, North Dakota.

9:30 to 10:00 a.m.—"Bleeding in Late Pregnancy"—Dr. John H. Randall, University of Iowa, Iowa City, Iowa.

10:00 to 10:30 a.m.—Exhibit time.

10:30 to 12:00 a.m.—Panel discussion: "Ovarian Tumors." Modrator, Dr. Joseph Kuzma, pathologist, Marquette University, Milwaukee, Wisconsin. Discussors, Dr. John Randall, gynecologist, Iowa City, Iowa; and Dr. C. Heilman, radiologist, Fargo, North Dakota.

1:30 to 2:30 p.m.—Farewell comments: Dr. Joseph Sorkness, Jamestown, North Dakota. Introduction: "50 Year" club members and honorary members. Inaugu Philip Woutat, Grand Forks, North Dakota. Inaugural address: Dr.

2:30 to 3:00 p.m.—"Some Phases of the Relationship between Courts and Doctors"—Mr. Louis Oehlert, Fargo, North Da-

kota.
3:00 to 3:15—Intermission.
3:45 to 5:00 p.m.—Meeting at the University of North Dakota Medical School Auditorium. "Ringworm of the Scalp"—Dr. Y. Tsumagari, University of North Dakota, Grand Forks; and Dr. E. Grinnell, Grand Forks.
5:15 p.m.—Drawing for door prize of \$25.

#### PRESIDENTIAL ADDRESS

JOSEPH SORKNESS, M.D. Jamestown, North Dakota

During the past year, medicine, and particularly organized medicine, has been much in the news; and the fact that laymen as a group are intensely interested in our problems has been demonstrated again and again. Perhaps the most spectacular publicity has resulted from Paul Hawley's assault on the fee splitters and the consequent reaction from various segments of the medical profession. It has been intimated that he and his organization are in direct conflict with the American Medical Association, but this cannot be wholly true as there is perhaps not a single member of the American College of Surgeons who is not a member of the American Medical Association. Both organizations are laboring toward the same end but differ in their choice of methods. Doctor Hawley would like to club the boys into line and the American Medical Association rather favors the finesse. The problem does exist, however, and apparently it is quite serious in some of our nearby states. We must stamp it out from within, rather than wait for pressure from without. I am confident that this will be done, and the best interests of our patient's thus served. In the final analysis, if organized medicine does not solve all problems in the best interests of the patient, organized medicine will not long endure.

Much has been made of the increasing cost of medical care, and of the increasing inability of people to pay this cost. A study of the problem reveals, however, that since 1935, although living costs in general have gone up 90.8 per cent, cost of medical care rose only 65.5 per cent. In this same period wages rose 165 per cent, while average medical fees rose only 48 per cent. We know from our daily work that although per diem hospital charges have risen spectacularly, improvements in technics and drugs have shortened the course of disease to such an extent that over-all costs are actually less than before. Those of us who practiced before 1940 have only to recall the history of a typical case of pneumonia or perforated appendix in those days to prove this point. I believe these problems can be readily solved within the framework of our present methods of practice.

A serious shortage of physicians has been alleged to exist in our country, more particularly during and after World War II, but still mentioned somewhere almost daily. Actually, we have more physicians per capita than any nation in the world except Israel, which is flooded with refugee physicians from Europe. Today we have 220,000 physicians in this country; 160,000 in active practice and the rest in teaching, research, government service – and about 9,700 retired – and in my experience, not many retire until totally disabled. Our medical schools this year will turn out 6,831 graduates, which is the greatest number in history; 279 more than were turned out in 1947 when accelerated programs initiated during the war resulted in some schools turning out two classes in one year. In our own state we now have something like 100 more practicing physicians than at the end of the war. Apparently, our local problem is one of distribution and I believe that the placement bureau established by our association during the past year will do much to improve distribution.

We are proud of the high standards of medical education in our country, and these high standards are in large part attributable to organized medicine, more especially the American Medical Association. After the Flexner Report in 1911, the American Medical Association imme-

diately set out to classify and standardize all our medical schools. As a result today all 79 schools in the United States and Canada are approved institutions, meeting the high standards necessary for this approval. Two additional schools have started a four-year program, but have not yet graduated a class. These are the University of Miami and the University of California in Los Angeles. Our own Dr. Harwood is now studying the problems ineident to improving medical education in our state and, if possible, to establish a four-year school. As you all know, the last legislature issued what amounted to a mandate to our university for the establishment of a four-year school in 1955. I am sure that legislature was not aware of the problems involved; fiscal, physical, and those involving personnel that would have to be solved before an approved four-year school could be launched. Perhaps this last point of approval was lost sight of in issuing this mandate; but I am sure our profession would never support such a program unless a fully approved school resulted. We are fortunate to have a man of Dr. Harwood's ability and experience to work on this problem. Let us give him our wholehearted support in this most difficult task.

Much can be done to improve and enlarge opportunities for the postgraduate education of the physician. The Continuation Center at the University of Minnesota has been a great help to our physicians, but too few are able to go to these splendid programs. Many states have traveling clinics which go out to the physicians. Admittedly, most of these states have four-year medical schools with much talent immediately available, but this should not deter us from making an effort in this direction. It is most unfortunate to see a well-trained physician deteriorate for lack of contact with his fellow physicians, either through our medical societies or postgraduate courses. No man is clever enough to give his patients the best possible care without consultation and interchange of ideas with his fellow physicians. Perhaps some men would have to be coerced into attending such programs, but our Mr. Limond is just the man to do this.

In the field of medical economics, slow but definite progress is being made. In studying this problem we find that there are three distinct groups with which we must deal. Their problems are different and the solutions not

necessarily the same.

The first group consists of those who are willing and able to meet their medical obligations. For this group organized medicine has promoted the use of voluntary health insurance, both by private and nonprofit organizations. This field has grown tremendously in the past ten years but still presents problems difficult to solve. One of the difficulties has been to cover all medical expenses in all cases, which some policies have attempted to do. Experience has shown that this involves so many small or so-called "nuisance" claims, that the expense of administration is prohibitive and consequently the rates must be so high that the policy cannot be sold. Also, many policies have been misrepresented to the purchasers, with the inevitable result of disappointed patients and doctors with headaches. Perhaps the promotion of "deductible" policies, whereby the patient pays the first \$25 or \$50 of the costs, will help to eliminate this problem providing the patient is completely informed of the terms of his policy. In this connection, the so-called "catastrophic illness" policies will find a useful place in furnishing protection from disastrous illnesses at relatively low cost. I believe it is still best for the private patient to pay his own bills where this is possible and works no real hardship on the family - it makes for better pa-

tient-doctor relationship and gives the patient a sense of responsibility and self-reliance which seems to be fast disappearing in this country.

In this connection every medical society has been urged to discourage excessive fees, and mediation committees have been set up in almost every state including our own, where disagreements and misunderstandings can be mediated. Frank discussion of the fee problem before the service is rendered seems to aid greatly in preventing trouble later. The practice of rendering prompt and reasonably itemized bills seems to be another method valuable in avoiding disagreement.

The second group of patients we must deal with are the frankly indigent. These people are dependent on outside assistance for their basic necessities and we believe their medical care is a responsibility of local and state government. No program of health insurance is feasible for this group since they are unable to pay for it. There-fore, direct payment by the governmental body responsible is the most practical and economical approach.

The third group encountered is the group of medically indigent. These people are normally able to meet the cost of their daily needs and to purchase health insurance. They should be encouraged to do so, but if illness occurs and they have no health insurance, then after proper investigation, help should be given directly by the governmental agency responsible. Further study of the medically indigent and the chronically ill must certainly be made. Despite the apparent classification of all people into definite groups, many borderline cases will occur where the physician must render service without hope of financial reward. It has been our pride that through the years this service has been rendered freely, and that all patients received our best efforts, whether or not financial reward followed. In thirty years of practice, I have yet to see anyone denied proper medical care, if they will but seek it.

The problems involved in the care of the aged become more acute each year as their members increase. It is estimated that there are now in excess of a million people in our country over the age of 80. A concomitant increase in the degenerative diseases is inevitable and is causing a great deal of concern within the medical profession and some criticism from without. In regard to cancer, Bell and Hebbels exhaustive study of autopsy findings in some 62,000 cases recorded between 1911 and 1952 in the twin city area would indicate that the increase in malignant disease has paralleled the increasing age of the population except in the case of cancer of the lung. This disease seems to have increased fourfold since 1911 and is presently of great concern to the cigarette companies. As the population age increases, we must look forward to more people of advanced years who are in need of some care at all time. In our own state I believe we are now well supplied with hospital beds for the care of those aged people who need hospital care, but we are woefully short of facilities to care for the aged who need only custodial care. In days gone by the family unit was strong and respect for our elders great. It was considered a privilege for the family to make the necessary sacrifices to see that these people were well cared for. Today, this sense of responsibility seems to have largely disappeared, along with many other sterling virtues which made our country great. It is a part of our responsibility as a profession to work increasingly for improved facilities for the care of the aged, whether this be in more and better homes for the aged or in improved care in the home, which most of them prefer.

It has been a privilege to serve the cause of organized

medicine in a small way during the past year, and I am grateful to you for the opportunity to do so. I am more convinced than ever that ours is the finest group of professional men in existence, and the splendid men coming up each year youchsafe that this will ever be true.

. . . .

Following the presidential address given by Dr. Sorkness, the presentation of the Fifty-Year Club awards was made by him. Pins and scrolls were presented to Drs. L. H. Kermott, Sr., Minot; O. A. Knutson, Buxton; L. H. Landry, Walhalla; and W. H. Witherstine, Grand Forks. Drs. J. L. Devine, Sr., Minot; and Dr. Albert M. Fisher, who were also eligible to become members of the Fifty-Year Club, were not present but were to be so notified.

To become a member of the Fifty-Year Club of the North Dakota State Medical Association, the individual must have graduated from a medical school fifty years prior to the current date and have practiced since.

To become an honorary member of the association, the individual must have received his license in North Dakota fifty years prior to the current date and practiced in the state since that time. The following members were named as honorary members of the association at this time: Drs. J. L. Devine, Sr., Minot; O. A. Knutson, Buxton; Olaf Sands, Fargo; and Nels Tronnes, Fargo.

Dr. Joseph Sorkness: It is with great pleasure that I now introduce to you, your incoming president, Doctor Woutat of Grand Forks. He has done very effective work with the association and I know will have a very successful administration this coming year.

INAUGURAL ADDRESS PHILIP WOUTAT, M.D. Grand Forks, North Dakota

Thank you, Dr. Sorkness, on behalf of the state association for many years of hard work, and for your fine administration of the affairs of our association during the past year. We hope to see you here for many years, staying active in the association.

During the past two decades, progress in medical science has increased at such a rate and in so many fields that our problems in diagnosing and treating our patients have become increasingly intricate, and the necessity for accurate diagnosis and treatment increasingly important. These rapid changes have also made more arduous the task of keeping ourselves medically intelligent, and of adopting new technics for the benefit of our own communities.

During these same years, political, social, and economic changes have occurred at an equally rapid rate. Some of these have further complicated the practice of medicine, influenced our daily living, and altered the fundamental philosophies of many people. Whether or not we consider these changes for better or for worse, most of them are here to stay in the same or a modified form, and more are coming. As a result, it has become necessary for us individually and through our medical organizations, to undertake activities with which we are not familiar, and which most of us did not contemplate when we entered medical school.

We must give serious thought to our part in future changes. There is increasing awareness and intelligence on the part of the general public regarding medical problems. There is evidence in recent years that governmental agencies, other nonmedical organizations, and whole communities are approaching the medical profession through our organizations, and individually, for advice regarding situations in their particular spheres of interest. The opportunity is being presented to the medi-

cal profession, both organized and individual, to advise and guide regarding medical matters. Thus we are in a position to influence future thought and action on the part of many individuals and many groups. How well we do this can determine to a large extent the future course of medical practice in this country.

The American Medical Association has expanded its activities tremendously and is a much more effective leader and advisor than it was ten years ago. Most state and local medical societies throughout the country have positive programs in fields of public relations, and in many community and state activities. Their effectiveness is limited by the freedom, finances, and cooperation their

members give them.

The most effective contacts physicians have with the general public is the daily two million or over personal contacts with patients. The individual practitioner can probably do more to influence the attitude of people toward medical problems than any organization or group, medical or nonmedical. In the past the doctor has been a key figure in community activity and responsibility. Yet one of the criticisms of physicians in recent years has been their failure to inform their patients and communities regarding medical problems, regarding the activities and policies of organized medicine, and most important, their failure to take their full part in community affairs. If we are to influence the thoughts of people in medical and related matters, we must put ourselves in a position where our opinions can be given and will be respected. The guidance of the future course of medicine in this country is, in large part, a matter of informing our neighbors and our public officials on matters in which we have specialized knowledge and should be taking a leading

I am astonished almost every week at the lack of knowledge of many physicians regarding the problems and activities of organized medicine and the thinking back of the policies adopted. This seems surprising in a group which has recently come so close to being taken over by governmental agencies. The continued activity of the socializers, and the introduction of increasing numbers of medical bills at each session of congress and state legislatures indicates that medical practice, as we

would like it, is far from secure.

The social, economic, and political problems confronting organized medicine are many, and lie in many different fields. A few of these are physician distribution, medical education and government subsidies, non-service-conneeted disabilities, the doctor-draft and dependent medical eare, compulsory social security, more adequate hospital and siekness insurance eoverage, the eare of the aged, rural health, nursing education, the unfavorable publicity of the faults of the few to the detriment of all, and many others. These are all important and formidable problems. Their proper solution requires the serious thought and intelligent ecoperation of all physicians. There has never been a time when it was more important that individual physicians be well informed about medical problems and policies, nationally, statewide, and locally.

Our part in the future course of medicine in this country seems clear. Our first duty, of course, is to properly diagnose and treat our patients, with personal interest and for a fair fee. Shoddy work, questionable practices, and excessive fees, discredit the individual and the whole profession. We must police our own ranks. The sins of the few reflect on all of us.

Beyond this, we must support our state and national organizations. The American Medical Association and

our state organizations have increased their activities in all fields. Their programs will be effective in proportion to the financial, moral, and intelligently active support we give them. Our part in these programs is to aid in their formation and development, to keep informed regarding the problems, the policies adopted, and the reasons therefore, and to inform our communities and our public officials. In these ways, we can hope to guide the course of medicine along paths we know are right.

In our state, examination of the work of our many committees, and of the council and house of delegates during the past year, reveals that much work has been done and much remains. We have important problems in the fields of public policy and legislation, medical economics, prepayment medical and hospital eare insurance, rural health, nursing supply and education, mental health, and medical education. The people of the state and the officers of our state association need your help in their proper solution.

I take this office with a feeling of deep appreciation for your expression of confidence. For that, I thank you. On behalf of myself and the other officers of our association, I ask your help and cooperation during the coming

year.

## North Dakota State Medical Association Roster-1954

#### MEMBERSHIP BY DISTRICTS

#### DEVILS LAKE

2-1112
Corbett, C. A Lake Region Clinic, Devils Lake
Engesather, J. A. D. Lakota
Fawcett, D. W Lake Region Clinic, Devils Lake
Fawcett, J. C Lake Region Clinic, Devils Lake
Fawcett, R. M Lake Region Clinic, Devils Lake
Fox, W. R Johnson Clinic, Rugby
Goodman, Edward H Rolla
Gray, Archie G Carrington
Johnson, C. G Johnson Clinic, Rugby
Keller, E. T. Johnson Clinic, Rugby
Lazareck, I. L
MacDonald, J. A Cando
Mahoney, J. H 411 4th Ave., Devils Lake
Miles, A. M. Rolla
Nicholson, E. G Lawton
Owens, C. G New Rockford
Palmer, D. W Cando
Pine, L. F Lake Region Clinic, Devils Lake
Platsko, M. D Edmore
Schwinghamer, E. J New Rockford
Seibel, Glenn W New Rockford
Sihler, W. F. (honorary)3 Mann Block, Devils Lake
Stickelberger, Josephine (honorary) 1524 Portland Ave.,
St. Paul 5, Minn.
Thordarson, John D
Toomey, G. W Lake Region Clinic, Devils Lake
Vigeland, G. N Johnson Clinic, Rugby
Voglewede, William C

#### FIRST

Amidon, Blaine F 702 1st Ave. S., Dakota Clinic, Fargo
Armstrong, W. B 702 1st Ave. S., Dakota Clinic, Fargo
Bacheller, S. C Enderlin
Bakke, HansLisbon
Bateman, C. V
Beithon, E. J
Beithon, Paul J 403 N. 7th St., Wahpeton
Beltz, Melvin E
Borland, V. G Fargo Clinic, 807 Broadway, Fargo
Burt, A. C 405 Black Bldg., Fargo
Christoferson, Lee
Clark, I. D., Jr
Corbus, B. C
Cullum, Albert G. J Fargo Clinic, 807 Broadway, Fargo
Darner, C. B Fargo Clinic, 807 Broadway, Fargo
Darrow, F. I. (retired)
Darrow, K. E 702 1st Ave. S., Dakota Clinic, Fargo

DeCesare, F. A 702 1st Avc. S., Dakota Clinic, Fargo
Dillard, J. R
Dodds, G. A Fargo Clinic, 807 Broadway, Fargo
Donat, T. L. Dakota Clinie, 702 1st Ave. S., Fargo
Fortin II I 212 Dlock Dldg Forgo
Fortin, H. J
Fortney, A. C. Fargo Clinic, 807 Broadway, Fargo
Foster, George C. 507 First National Bank Bldg., Fargo
Geib, M. J 32 North 3rd, Moorhead, Minn.
Gillam, John S Fargo Clinic, 807 Broadway, Fargo
Gronvold, F. O. (honorary)910 Broadway, Fargo
Gustafson, Maynard B 435 deLendrecie Bldg., Fargo
Hall, G. H Fargo Clinic, 807 Broadway, Fargo
Haugrud, E. M
Hawn, H. W. Fargo Clinic, 807 Broadway, Fargo
nawn, n. W rargo Clinic, 607 broadway, rargo
Heilman, C. O Fargo Clinic, 807 Broadway, Fargo
Hunter, C. M
Hunter, G. Wilson Fargo Clinic, 807 Broadway, Fargo
Irvine, V. S Lidgerwood
Ivers, G. U
Jaehning, David
Klein, A. L
Koons, Wilbur Lidgerwood
William Per 126 Court Lat Ct. West Forms
Kulland, Roy
Lancaster, W. E. G. Fargo Clinic, 807 Broadway, Fargo
Landa, Marshall. Dakota Clinic, 702 1st Ave. S., Fargo
Landa, Marshall. Dakota Clinic, 702 1st Ave. S., Fargo Larson, G. A 608 Black Bldg., Fargo
Landa, Marshall Dakota Clinic, 702 1st Ave. S., Fargo Larson, G. A. 608 Black Bldg., Fargo LeBien, W. E. Fargo Clinic, 807 Broadway, Fargo
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Landa, Marshall Dakota Clinic, 702 1st Ave. S., Fargo Larson, G. A. 608 Black Bldg., Fargo LeBien, W. E. Fargo Clinic, 807 Broadway, Fargo LeMar, John Fargo Clinic, 807 Broadway, Fargo Lewis, A. K. Lisbon Lewis, T. H. 302 Black Bldg., Fargo
Landa, Marshall Dakota Clinic, 702 1st Ave. S., Fargo Larson, G. A. 608 Black Bldg., Fargo LeBien, W. E. Fargo Clinic, 807 Broadway, Fargo LeMar, John Fargo Clinic, 807 Broadway, Fargo Lewis, A. K. Lisbon Lewis, T. H. 302 Black Bldg., Fargo
Landa, Marshall Dakota Clinic, 702 1st Ave. S., Fargo Larson, G. A. 608 Black Bldg., Fargo LeBien, W. E. Fargo Clinic, 807 Broadway, Fargo LeMar, John Fargo Clinic, 807 Broadway, Fargo Lewis, A. K. Lisbon Lewis, T. H. 302 Black Bldg., Fargo Lindsay, D. T. (in service) Fargo Long, W. H. Dakota Clinic, 702 1st Ave. S., Fargo
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Landa, Marshall Dakota Clinic, 702 1st Ave. S., Fargo Larson, G. A. 608 Black Bldg., Fargo LeBien, W. E. Fargo Clinic, 807 Broadway, Fargo LeWis, A. K. Lisbon Lewis, T. H. 302 Black Bldg., Fargo Lindsay, D. T. (in service) Fargo Lindsay, D. T. (in service) Fargo Long, W. H. Dakota Clinic, 702 1st Ave. S., Fargo Lytle, F. T. Fargo Clinic, 807 Broadway, Fargo Macaulay, W. L. Fargo Clinic, 807 Broadway, Fargo Mazur, B. A. Dakota Clinic, 702 1st Ave. S., Fargo Melton, Frank M. Dakota Clinic, 702 1st Ave. S., Fargo Miller, H. H. 509½ Dakota Ave., Wahpeton Morris, A. C. (retired—honorary) 609 Front, Fargo Nagle, Duane W. Enderlin
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Landa, Marshall Dakota Clinic, 702 1st Ave. S., Fargo Larson, G. A. 608 Black Bldg., Fargo LeBien, W. E. Fargo Clinic, 807 Broadway, Fargo LeWis, A. K. Lisbon Lewis, T. H. 302 Black Bldg., Fargo Lindsay, D. T. (in service) Fargo Long, W. H. Dakota Clinic, 702 1st Ave. S., Fargo Lytle, F. T. Fargo Clinic, 807 Broadway, Fargo Macaulay, W. L. Fargo Clinic, 807 Broadway, Fargo Mazur, B. A. Dakota Clinic, 702 1st Ave. S., Fargo Melton, Frank M. Dakota Clinic, 702 1st Ave. S., Fargo Miller, H. H. 509½ Dakota Ave., Wahpeton Morris, A. C. (retired—honorary) 609 Front, Fargo Nagle, Duane W. Enderlin Nichols, W. C. Fargo Clinic, 807 Broadway, Fargo Nuessle, William F. (in service) Fargo Oftedal, Trygve 403 Black Bldg., Fargo Poindexter, M. H. Fargo Clinic, 807 Broadway, Fargo Pray, L. G. Fargo Clinic, 807 Broadway, Fargo Pray, L. G. Fargo Clinic, 807 Broadway, Fargo Rogers, R. G. Dakota Clinic, 702 1st Ave. S., Fargo Rogers, R. G. Dakota Clinic, 702 1st Ave. S., Fargo Rogers, R. G. Dakota Clinic, 702 1st Ave. S., Fargo
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Landa, Marshall Dakota Clinic, 702 1st Ave. S., Fargo Larson, G. A. 608 Black Bldg., Fargo LeBien, W. E. Fargo Clinic, 807 Broadway, Fargo LeMar, John Fargo Clinic, 807 Broadway, Fargo Lewis, A. K. Lisbon Lewis, T. H. 302 Black Bldg., Fargo Lindsay, D. T. (in service) Fargo Long, W. H. Dakota Clinic, 702 1st Ave. S., Fargo Lytle, F. T. Fargo Clinic, 807 Broadway, Fargo Macaulay, W. L. Fargo Clinic, 807 Broadway, Fargo Mazur, B. A. Dakota Clinic, 702 1st Ave. S., Fargo Melton, Frank M. Dakota Clinic, 702 1st Ave. S., Fargo Miller, H. H. 509½ Dakota Ave., Wahpeton Morris, A. C. (retired—honorary) 609 Front, Fargo Nagle, Duane W. Enderlin Nichols, W. C. Fargo Clinic, 807 Broadway, Fargo Nuessle, William F. (in service) Fargo Oftedal, Trygve 403 Black Bldg., Fargo Poindexter, M. H. Fargo Clinic, 807 Broadway, Fargo Pray, L. G. Fargo Clinic, 807 Broadway, Fargo Rogers, R. G. Dakota Clinic, 702 1st Ave. S., Fargo Sand, Olaf (retired—honorary) 401 10th St. S., Fargo Schleinitz, F. B. Hankinson
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Skjelset, A. G Fargo Clinic, 807 Broadway, Fargo	Osten, Taylor A Michigan
Spier, Jack J	Painter, Robert C. Grand Forks Clinic, 221 S. 4th St.,
Stafne, W. A. Fargo Clinic, 807 Broadway, Fargo Swanson, J. C. 407 Black Bldg., Fargo	
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Wasemiller, E. R Wahpeton Clinic, Wahpeton	Piltingsrud, H. R
Webster, William O. Fargo Clinic, 807 Broadway, Fargo	Porter, Charles B Grand Forks Clinic, 221 S. 4th St.,
Weible, R. D Dakota Clinic, 702 1st Ave. S., Fargo	Grand Forks
Wiltse, Glenn L. Wahpeton Clinic, Wahpeton	Quale, V. S
Wold, Lester E. Fargo Clinic, 807 Broadway, Fargo Zauner, Richard J. 311 Black Bldg., Fargo	Ralston, Lloyd S Grand Forks Clinic, 221 S. 4th St., Grand Forks
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Connor, J. F	St. Clair, Robert T517 First Natl. Bank Bldg.,
Countryman, G. L. Grafton	Strom, Adrian D
Culmer, A. E., Jr 501 1st National Bank Bldg.,	Strom, Adrian D Langdon
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Glaspel, C. J Box 228, Grafton	Vance, R. W
Goehl, R. O Grand Forks Clinic, 221 S. 4th St.,	Waldren, H. M., Jr
Grand Forks Graham, C. M	Witherstine, W. H
Graham, John	Woutat, P. H Grand Forks Clinic, 221 S. 4th St.,
Grinnell, E. L. Grand Forks Clinic, 221 S. 4th St.,	Grand Forks
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Hardy, N. A. Grand Forks Minto	Grand Forks
Harwood, T. H. University of North Dakota, Grand Forks	KOTANA
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Hill, Frank A Grand Forks Clinic, 221 S. 4th St.,	Williston
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Leigh, R. E. 111 N. 5th St., Leigh Clinic, Grand Forks	McPhail, C. O Crosby
Liebeler, W. A	Pile, Duane F Crosby
Lommen, C. E Fordville	Skjei, D. E. 11½ E. Broadway, Williston Clinic, Williston
Longmire, Thomas Sharon  Mehoweld R. F. 504 Red River Netl Repk Bldg	Wright, W. A11½ E. Broadway, Williston Clinic,
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Moore, J. H Grand Forks Clinic, 221 S. 4th St.,	NORTHWEST
Grand Forks	Ayash, John J
Muus, J. Meyer McVille	Beck, Charles
Muus, O. H	Blatherwick, Robert Parshall
Grand Forks	Blatherwick, W. E

Boyum, Lowell E. Harvey Boyum, P. A. Harvey Breslich, Paul J. Northwest Clinic, Minot Cameron, A. L. Northwest Clinic, Minot	Wakefield, Kenneth Cooperstown Wicks, Edwin O. 133 N. W. 3rd, Valley City
Boyum, P. A	Wicks, Edwin O 133 N. W. 3rd, Valley City
Breslich, Paul J. Northwest Clinic, Minot	Wicks, F. L
Common A. I. Northwest Clinic, Minot	Tricks, 1. D
Cameron, A. L Northwest Clinic, Minot	SIXTH
Clark, Joseph H Northwest Clinic, Minot	
Conroy, M. P	Arneson, C. A Missouri Valley Clinic, Bismarck
Craise, O. S Towner	Bahamonde, Jose M Elgin
Cranston, Robert Tioga	Baumgartner, C. J. Quain and Ramstad Clinic, Bismarck
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Fischer, V. J	Berthcau, H. J Linton
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Goodman, RobertPowers Lake	Boyle, John T
Greene, E. E	Brink, N. O Quain and Ramstad Clinic, Bismarck
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Hammargren, A. F	Dahl, Philip Missouri Valley Clinic, Bismarck
Hart, George MNorthwest Clinic, Minot	
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Horner, David B Northwest Clinic, Minot	DeMoully, O. M Flasher
Huntley, Wellington B. 17A Central Ave. W., Minot	Diven, W. L
	Enders, W. R
Hurly, William C Garrison Bldg., Minot	
Johnson, J. A. (honorary)Bottineau	Ericksen, Johan Quain and Ramstad Clinic, Bismarck
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Kaemerle, Harold K Stanley	Freise, P. W Quain and Ramstad Clinic, Bismarck
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	Goughnour, Myron 405 Broadway, Bismarck
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Kitto, William Northwest Clinic, Minot	
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Larson, R. S Velva	Harrington, James F 107 1st Ave. N. W., Mandan
Livingston, N. B. (in service)	Heffron, M. M
	Henderson, R. W 405 Broadway, Bismarck
Loeb, George L	Hetzler, A. E
McArdle, John S 17A Central Ave. W., Minot	James L. C. D. Owie and Bounded Clinic Diamends
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Malvey, Kenneth Bottineau	Jacobson, M. S. Elgin
Naegeli, F. D Northwest Clinic, Minot	Johnson, Kenneth J Quain and Ramstad Clinic,
Nelson, L. F Bottineau	Bismarck
Olson, B. G. McCannel Clinie, Minot	Johnson, Marlin J. E Quain and Ramstad Clinic,
Described Charles Mind	Bismarck
Rowe, P. H Northwest Clinic, Minot	
Sahl, Jens, Jr Northwest Clinic, Minot	Johnson, Paul L Quain and Ramstad Clinic, Bismarek
Seiffert, G. S Northwest Clinic, Minot	Kalnins, Arnold Washburn
Shea, Samuel	Kling, Robert R Quain and Ramstad Clinic, Bismarck
Sorenson, A. R	77 1' YY 11
	Kuplis, HaraldsTurtle Lake
Sorenson, Rodger 105 Central Ave. E. Minot	LaRose, V. J. (retired—honorary)712 Mandan,
Sorenson, Rodger 105 Central Ave. E., Minot	LaRose, V. J. (retired-honorary)712 Mandan,
	LaRose, V. J. (retired—honorary)712 Mandan, Bismarck
Taylor, William R. Kenmare Uthus, O. S. 21½ 2nd Ave. S. E., Minot	LaRose, V. J. (retired—honorary)712 Mandan, Bismarck Larson, L. W Quain and Ramstad Clinic, Bismarck
Taylor, William R. Kenmare Uthus, O. S. 21½ 2nd Ave. S. E., Minot Veenbaas, Fred F. Erenfeld Clinic, Minot	LaRose, V. J. (retired—honorary)712 Mandan, Bismarck Larson, L. W Quain and Ramstad Clinic, Bismarck Levi, W. E
Taylor, William R. Kenmare Uthus, O. S. 21½ 2nd Ave. S. E., Minot Veenbaas, Fred F. Erenfeld Clinic, Minot Wall, W. W. Northwest Clinic, Minot	LaRose, V. J. (retired—honorary)712 Mandan, Bismarck Larson, L. W Quain and Ramstad Clinic, Bismarck Levi, W. E
Taylor, William R. Kenmare Uthus, O. S. 21½ 2nd Ave. S. E., Minot Veenbaas, Fred F. Erenfeld Clinic, Minot Wall, W. W. Northwest Clinic, Minot Wallis, Marianne 3rd St. & 4th Ave., S. E., Minot	LaRose, V. J. (retired—honorary)
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Taylor, William R. Kenmare Uthus, O. S. 21½ 2nd Ave. S. E., Minot Veenbaas, Fred F. Erenfeld Clinic, Minot Wall, W. W. Northwest Clinic, Minot Wallis, Marianne 3rd St. & 4th Ave., S. E., Minot	Larose, V. J. (retired—honorary)
Taylor, William R. Kenmare Uthus, O. S. 21½ 2nd Ave. S. E., Minot Veenbaas, Fred F. Erenfeld Clinic, Minot Wall, W. W. Northwest Clinic, Minot Wallis, Marianne 3rd St. & 4th Ave., S. E., Minot Wheelon, F. E. (honorary) 215 5th Ave. N. W., Minot	LaRose, V. J. (retired—honorary)
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Tavlor, William R. Kenmare Uthus, O. S. 21½ 2nd Ave. S. E., Minot Veenbaas, Fred F. Erenfeld Clinic, Minot Wall, W. W. Northwest Clinic, Minot Wallis, Marianne 3rd St. & 4th Ave., S. E., Minot Wheelon, F. E. (honorary) 215 5th Ave. N. W., Minot Woodhull, R. B. Northwest Clinic, Minot  SHEYENNE VALLEY Christianson, Gunder 117 N. W. 3rd, Valley City Fennell, William L. Cooperstown Gilsdorf, W. H. 125 N. E. 3rd, Valley City Klein, C. J. 117 N. W. 3rd, Valley City Macdonald, A. C. 130 Central Ave. S., Valley City	LaRose, V. J. (retired—honorary)
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Tavlor, William R. Kenmare Uthus, O. S. 21½ 2nd Ave. S. E., Minot Veenbaas, Fred F. Erenfeld Clinic, Minot Wall, W. W. Northwest Clinic, Minot Wallis, Marianne 3rd St. & 4th Ave., S. E., Minot Wheelon, F. E. (honorary) 215 5th Ave. N. W., Minot Woodhull, R. B. Northwest Clinic, Minot  SHEYENNE VALLEY Christianson, Gunder 117 N. W. 3rd, Valley City Fennell, William L. Cooperstown Gilsdorf, W. H. 125 N. E. 3rd, Valley City Klein, C. J. 117 N. W. 3rd, Valley City Macdonald, A. C. 130 Central Ave. S., Valley City	LaRose, V. J. (retired—honorary)

Schoregge, C. W. Quain and Ramstad Clinic, Bismarck Schoregge, R. D. Quain and Ramstad Clinic, Bismarck
Smith, C. C 506 N. W. 3rd, Mandan
Spielman, George (retired) 305 1st Ave. N. W., Mandan Thompson, Arnold Quain and Ramstad Clinic, Bismarck
Tudor, Robert B. Quain and Ramstad Clinic, Bismarck Vinje, E. G. Hazen
Vinje, Ralph
Waldschmidt Quain and Ramstad Clinic, Bismarck Weyrens, P. J Hebron
Zukowski, Anthony Steele

#### SOUTHWESTERN

Bush, Clarence A	Beach
Curiskis, Adolf	New England
Denser, John W	Bowman
Dukart, C. R.	Dickinson Clinie, Dickinson
Dukart, Ralph	Dickinson Clinic, Dickinson
Foster, Keith G	. 109 7th St. W., Dickinson
Gilliland, R. F	Dickinson Clinic, Dickinson
	Dickinson Clinic, Dickinson
	Bowman
Guloien, H. E.	Dickinson Clinic, Dickinson
Gumper, A. J	109 W. 7th, Dickinson
	Regent
	109 W. 7th, Dickinson
	Killdeer
	Richardton
Murray, K. M. (retired)	Scranton
Reichert, D. L	24 W. Villard, Dickinson
Reichert, H. L	24 W. Villard, Dickinson
Rodgers, R. W	109 W. 7th, Dickinson
Smith, Oscar M. (retired)	205 Sims, Dickinson
	ce) Dickinson
	.610 1st Ave. W., Dickinson
	Hettinger
	Richardton
7. 3	

#### STUTSMAN

Arzt, P	. G		DePuy-Sorkness	Clinic,	Jamestown
Beall, ]	John A	A	Medical Arts	Clinic,	Jamestown

Christenson, Paul F DePuy-Sorkness Clinic, Jamestown
Crayclice, W. A Oakes
Craychce, W. A
Fergusson, V. D Edgeley
Gerrish, W. A. (honorary) 1801 S. 8th St.,
Albambra Cal
Alhambra, Cal. Gronewald, Tula W State Hospital, Jamestown
Hayward, Mark Gackle
Hieb, Edwin O. DePuy-Sorkness Clinic, Jamestown
Hogan, C. W. DePuy-Sorkness Clinic, Jamestown
Holt, G. H
Jansonius, J. W Medical Arts Clinic, Jamestown
Violation scan Control
Kristjansson, Gestur Ellendale
Kuisk, Hans Rutland
Larson, E. J DePuy-Sorkness Clinic, Jamestown
Lucy, R. E DePuy-Sorkness Clinic, Jamestown
Lynde, Roy Ellendale
McFadden, Robert L. DePuy-Sorkness Clinic, Jamestown
Maloney, Basil W. (in service)LaMoure
Martin, Clarence S Kensal
Melzer, S. W
Miles, James V DePuy-Sorkness Clinic, Jamestown
Nierling, R. D DePuy-Sorkness Clinic, Jamestown
Oster, Ellis Ellendale
Pederson, T. D DePuy-Sorkness Clinic, Jamestown
Sorkness, Joseph DePuy-Sorkness Clinic, Jamestown
Turner, Neville W. LaMoure
Van DerLinde, J. M Medical Arts Clinic, Jamestown
Van Houten, R. W Oakes
Wood, W. W. (retired)509 2nd Ave. N. E.,
Iamestown
Woodward, Robert S DePuy-Sorkness Clinic,
Jamestown
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TRAILL STEELE

Dekker, O. D. Finley
Kjelland, A. A. Hatton
Knutson, O. A. (honorary) Buxton
LaFleur, H. AMayville
Little, R. C Mayville
McLean, Robert W Hillsboro
Pearson, L. O Mayville
Vandergon, Keith G Portland
Vinje, Syver Hillsboro

#### EIGHTH ANNUAL MEETING

#### WOMAN'S AUXILIARY TO THE NORTH DAKOTA STATE MEDICAL ASSOCIATION Grand Forks, North Dakota, May 1, 2, 3 and 4, 1954

The eighth annual meeting of the Woman's Auxiliary to the North Dakota State Medical Association was held in the medical school auditorium, University of North Dakota, Grand Forks,

Monday, May 3, 1954 at 10:00 a.m.

Mrs. P. C. Arzt, our first state president, presented a gavel as a gift to the auxiliary. Mrs. Henry Kermott, in her acceptance of the gavel, thanked Mrs. Arzt in behalf of the auxiliary for her generous and thoughtful gift. The meeting was then formally opened by Mrs. Kermott.

The pledge of loyalty was given by Mrs. S. C. Bacheller and repeated in unison by the members present. The group stood to-

gether for a silent prayer for peace.

Mrs. R. O. Coehl, Grand Forks, gave the address of welcome on hehalf of the Woman's Auxiliary of the Grand Forks District. She then introduced Mrs. H. D. Benwell, general convention chairman. The response was given by Mrs. J. H. Mahoney, Devils Lake.

Mrs. Kermott then presented the honored guest and speaker of the convention, Mrs. Raymond M. Schulte, Spokane, Washington, second vice-president of the Woman's Auxiliary to the American

Medical Association.

The roll was called and the following were present: Mrs. Henry Kermott, president; Mrs. S. C. Bacheller, president-elect; Mrs. J. H. Mahoney, first vice-president; Mrs. C. A. Arneson, second vice-president, Mrs. J. W. Jansonius, recording secretary; and

Mrs. V. J. Fischer, treasurer.

State chairmen: Mrs. Paul Johnson, bulletin; Mrs. John T. Cartwright, public relations; Mrs. M. S. Jacobson, nurse recruitment; Mrs. Joseph Sorkness, resolutions; Mrs. G. G. Thorgrimsen, press and publicity, nominating; Mrs. C. D. Certson, rural health; Mrs. Ted Keller, program; and Mrs. Milton Berg, student loan fund.

fund.

District presidents: Mrs. M. M. Heffron, Bismarck; Mrs. H. D. Benwell, Crand Forks; Mrs. L. E. Wold, Fargo; Mrs. Keith Vandergon, Portland; and Mrs. E. J. Hagen, Williston.

Delegates: Mrs. B. A. Mazur, Fargo; Mrs. F. A. DeCesare, Fargo; Mrs. J. D. Craven, Williston; Mrs. R. F. Gilliland, Dickinson; Mrs. R. H. Waldschmidt, Bismarck; Mrs. R. T. Cammel, Kenmare; Mrs. P. G. Arzt, Jamestown; Mrs. W. C. Dailey, Grand Forks; and Mrs. M. P. Conroy, Minot.

Councillor: Mrs. O. M. DeMoully, Flasher.

Mrs. Jansonius moved that the minutes of the executive board meeting of the Woman's Auxiliary held in Minot October 7, 1953.

meeting of the Woman's Auxiliary held in Minot, October 7, 1953 be approved as read. Motion carried. She also moved that the minutes of the seventh annual meeting of the Woman's Auxiliary held in Minot, May 9, 10, 11, and 12, 1953 be approved. Motion was seconded and carried.

Mrs. V. J. Fischer then read the following treasurer's report:

T	*
Treasurer's Report—1953-1954 Receipts:	
Balance on hand, May 1953 \$2,173.25	0
Dues	
Sale of handbook 1.4	
Sophomore student loan fund 1,373.00	
(Additional \$32.00 sent directly to U.N.D.	U
by Southwest District)—\$1,405.00 Total	
State medical society, convention fund	
donation	0
Registration fee at convention 91.00	
registration fee at convention	_
Total receipts	\$4,615.6
Disbursements:	ψ1,010.0
Convention (May 1953—Minot) \$ 226.78	8
Convention (May 1954—Grand Forks) . 248.6	
Dues to national	
University of North Dakota	
sophomore student loan fund, 1953 1,121.8	5
1954 1,373.00	
(Additional \$32.00 sent directly to U.N.D.	
—Total, \$1.405.00)	
President's expenses:	
National convention	2
Board meeting 84.9	7
Miscellaneous	0
President-elect's expenses, board meeting 82.23	
Stationery	
News Letter 80.00	
Standing committees	
President's pin	
Bank charges 1.00	0
	-
Total disbursements	\$3,721.3
Balance on hand, July 1, 1954	\$ 894.3

Mrs. Jansonius read the following action of the conneil:

Action of the Council on Donation for Women's Auxiliary

Doctor Youngs: I move that we allow the \$200 donation for the Woman's Auxiliary for their annual meeting, with the understanding that the auxiliary be expected to take care of the expense of their own publicity, such as the news letter.

Doctor Radl: 1 second this.

Doctor Fawcett: All in faver? All ayes. Motion carried.

The following reports were given by the officers, state chairmen, councillors, and auxiliary presidents:

#### President's Report

The Woman's Auxiliary to the North Dakota State Medical Association sends greetings to our national president, Mrs. Leo J. Schaefer, and to all the national officers and members of the Woman's Auxiliary to the American Medical Association.

Our auxiliary is only seven years of age but we are constantly increasing our membership and widening our activities. Distances between towns and cities in North Dakota are great, but we feel the auxiliary has drawn us closer together in our work for common purposes.

North Dakota is completely organized with 10 districts, with a total membership of 262 members and 1 honorary member. A special effort has been made this year to personally contact each eligible doctor's wife who had not previously joined the auxiliary and through this campaign a number of new members were added.

It seems that each year the programs become more interesting and varied in their theme. Of special interest is the increasing number of speakers who have talked on subjects pertinent to our times and suggested topics by the national auxiliary program. A few districts are small and of necessity have not had regular

programs, but have met for purely social times.

Many of our auxiliary members are active in various organiza-Many of our auxiliary members are active in various organizations such as, Red Cross, Blood Bank, TB X-ray Units., Mental Health, Pre-school Clinic, Nurse Recruitment, Diabetic Clinics, Community Chest, Campfire Board, Y.W.C.A., Cancer Program, March of Dimes, Parent-Teacher Association, and various hos-

pital auxiliaries, and church work.

Our interest in nurse recruitment is increasing with each year. We have helped to provide speakers on the subject "Nursing as a Career," distributed brochures and pamphlets, shown nursing films to senior high school students, organized two new future nursing clubs, and provided transportation for recruitment teams from hospitals. Our nurse recruitment chairman is compiling a list of all available nursing scholarships and loan funds in the state. We feel this will be of assistance to girls wishing to enter nurses training.

We have not been active in the mental health program this year

but have plans for next year.

North Dakota is a rural state and auxiliary members have attended rural health conferences and been active in rural health programs.

District auxiliaries have assisted in organizing civil defense. Many members are sky watching and one district is taking the American Red Cross First Aid Course.

The response to our publications, Bulletin and Today's Health, was disappointing. Fifty-one members have subscribed to the Bulletin and our state has a percentage of 53 per cent in Today's Health subscriptions. We are very proud of Devils Lake District with 246 per cent in Today's Health subscriptions.

Four excellent News Letters have been published this year. These letters contained social items, district auxiliary news, and activities, and various articles written by members on recent developments in medical and current affairs of interest to doctors' wives.

Our historian has compiled an interesting scrapbook which was on display at the state convention.

Of special interest is our major project, the sophomore medical student loan fund. Over \$1,300 will be added to the fund this vear. The dean of the medical school of the University of North Dakota assures us this loan fund fills a great need, and the Woman's Auxiliary to the North Dakota Medical Association is proud to have contributed in a small way to furthering medical education.

Our state convention was held in Grand Forks, May 1, 2, 3, our state convention was need in Grand Forks, May 1, 2, 3, and 4 with Mrs. Raymond Schulte, second vice-president of the Woman's Auxiliary to the American Medical Association, as our speaker and guest. We wish to thank the national auxiliary for making it possible for her to be with us and Mrs. Schulte for her gracious and helpful assistance.

Mrs. Stephen Bacheller, president-elect, and I were privileged to attend the national convention in New York City and the fall

conference in Chicago, for national officers, state presidents, and presidents-elect. These were thrilling experiences.

I feel the fall conference is a very important meeting and one the state president and president-elect should not fail to attend. I received a better understanding of the work and organization of our auxiliary, and returned to North Dakota filled with enthusiasm and inspiration.

I extend my sincere thanks to the North Dakota State Medical Association for their fine cooperation and support and to Mrs. Leo J. Schaefer, national auxiliary president, and all the national and state officers and members of the auxiliary for their cooperation. I especially want to thank the members of my own Northwest District for their love and loyalty and the Grand Forks District for their efforts which made our state convention a successful one. Truly we can say "Together We Have Progressed." MRS. HENRY KERMOTT, President

#### Organization Report

At the time of our state convention in Grand Forks, the medical auxiliary consisted of 261 members. Dividing this into the 10 districts, First District had 55 members; Northwest, 29; Devils Lake, 12; Grand Forks, 58; Kotana, 11; Sheyenne Valley, 11; Sixth District, 37; Southwest, 18; Stutsman, 21; Traill-Steele, 8; and we have 1 honorary member, Mrs. Mason G. Lawson, na tional treasurer.

A special effort has been made this year to personally contact each eligible doctor's wife who had not previously joined the auxiliary, and through this campaign a number of new members were added.

Officers and chairmen of standing committees for 1954-1955

President-Mrs. Stephen C. Bacheller, Enderlin. President—lect—Mrs. James H. Mahoney, Devils Lake. First vice-president—Mrs. C. A. Arneson, Bismarck. Second vice-president—Mrs. George H. Holt, Jamestown. Recording secretary—Mrs. J. W. Jansonius, Jamestown. Treasurer—Mrs. V. J. Fischer, Minot.

Organization and membership—Mrs. James H. Mahoney, Devils Ľake.

Program—Mrs. C. A. Arneson, Bismarck. Today's Health—Mrs. John A. Beall, Jamestown. Bulletin—Mrs. H. L. Kermott, Minot. Nominating-Mrs. H. L. Kermott, Minot. Civil Defense—Mrs. Ralph E. Mahowald, Grand Forks. Historian—Mrs. D. J. Halliday, Kenmare. Legislation—Mrs. Clyde L. Smith, Bismarck. Legislation—Mrs. Clyde L. Smith, Dismarck. Public relations—Mrs. John D. LeMar, Fargo. Nurse recruitment—Mrs. A. K. Lewis, Lisbon. Resolutions—Mrs. E. J. Beithon, Wahpeton. Rural health—Mrs. G. D. Gertson, Grand Forks. A.M.E.F.—Mrs. W. E. G. Lancaster, Fargo. Parliamentarian—Mrs. George H. Holt, Jamestown.
Press and publicity—Mrs. G. G. Thorgrimsen, Grand Forks.
Mental health—Mrs. John T. Cartwright, Bismarck.

#### Public Relations Report, 1953-1954

Six of the 10 auxiliaries in the state of North Dakota sent in a public relations report to the state chairman. In general it was felt that the most important public relations project for the year in the state was the student loan fund raising campaign which was carried on by all auxiliaries.

However, there was a wide variety of activities in which auxiliary members participated both as individuals and as a group that were valuable as good public relations. Two of the most popular local projects were assisting with mobile tuberculosis and cancer detection units. Civil defense also figured prominently as an individual activity with Sky Watch and Filter Center work getting cooperation from many auxiliary members.

Nurse recruitment was another phase of public relations which received support from the Woman's Auxiliary. This program was carried on by giving talks to senior girls in the high schools and showing films to stimulate interest in nursing as a career.

Among the varied activities which were included in the public relations reports were: assisting in the physical therapy department at the Crippled Children's School, supporting fluoridation of town's water supply, selling articles made by patients in tuherculosis hospitals with entire proceeds going to patients, sponsoring a food sale, assisting a needy family through the welfare office at Christmas, participation of individual members in Community Chest drives, and the polio vaccine project.

Although none of the auxiliaries sponsored a formal public relations meeting as such, there is a growing awareness among doctors' wives of the value of creating and maintaining good public relations by entering wholeheartedly into civic, health, and welfare projects. It is to be hoped that the medical auxiliaries of North Dakota will continue the good work which they have started, and that in future years all the auxiliaries in the state will report an organized effort to promote public relations.

Mrs. John T. Cartwright, Chairman

#### Program Report

In compiling the yearly program report, it has been very gratifying to hear from 7 of our districts. Perhaps that does not seem as complete as it should be, but several of our districts are very small in the number of members and therefore they do not have regular programs, but meet for a purely social time.

It seems that each year the programs become more interesting and varied in their themes. Of special interest is the increased number of outside speakers who have talked on various subjects, yet all were pertinent to the times, and of interest to the auxiliary

members.

Some of the most outstanding were Dr. R. T. Gammel's talk on the "Mexican Building Exposition," and many lovely colored slides were shown. Mr. Hal Pufall, speech therapist from the Minot State Teachers College, gave a talk on the "Medical and Surgical Aspects of Speech Defects."

Several districts had speakers on civil defense. Among them were Mr. Vernon Fahy, civil defense chairman from Ward county, and Mr. A. Neil York, Grand Forks City chairman, who had invited 3 men from Fargo to show excellent sound pictures and answer questions during a round table discussion which followed

the meeting.

In almost every district, the members in some way have participated in civil defense work, and each member is to be highly commended for any amount of time she has given for such vital work. One district reported a talk and film on the "Ground Ohservers Corps.'

"The Educated Heart," an article written by Dr. Kenneth Mc-Farland was reviewed. This article was presented at the national medical auxiliary convention held in New York City last summer,

and also appeared in the October issue of the Bulletin.

One program had a film and a talk on "We Must Be Prepared." This was presented by a state highway patrolman. Another talk was given by a professional florist on the care of house plants, and a demonstration was held on flower arrangement.

Some of the most interesting work done by the auxiliary memhers includes making weekly rounds to the hospital patients with the "Courtesy Cart." This project was started by the Mercy Hos-

the Courtesy Cart. This project that the Courtesy Cart. This pright Auxiliary in Valley City.

One member has charge of the Traveling Library Cart. This cart visits the hospital patients once a week, and the service is sponsored by the Valley City Public Lihrary.

Mrs. C. D. Gertson of Grand Forks holds the position of vol-unteer field consultant attached to the National Red Cross. Her territory covers all of North Dakota and the western part of Minnesota.

The Devils Lake District Auxiliary served a beautiful tea to the nurses when they held the State Nurses Convention in Devils Lake last October.

Lake last Octoher.

By far the majority of auxiliary members are active in these various organizations, namely: Red Cross, Blood Bank, TB, X-ray Unit, Scouting—both hoys and girls, Mental Health, Pre-School Clinic, Crippled Children Clinic, Nurse Recruitment, Diabetic Clinics, Community Chest, Campfire Board, Y.W.C.A., Cancer Program, March of Dimes, P.T.A., Various Hospital Auxiliaries, yearly inoculations in the schools, and with pleasure it can be reported that several districts mentioned church work reported that several districts mentioned church work.

All districts have participated in the student loan fund.

In summarizing hriefly, all of the districts have shown increased interest in program work and we feel very sure that it will con-tinue to expand and be more successful each year. Mrs. E. T. Keller, Chairman

#### Legislative Report, 1953-1954

For the state of North Dakota in 1953-1954, there have been no real medical legislative problems; accordingly, the committee on legislation has been relatively inactive. This fact is primarily because the state legislature did not meet; but with the 34th legislative assembly heginning early in 1955, renewed interest and activities will again become evident. Prior to this, however, interest in the June primary and November elections will be exhibited to elect competent personnel favorable to our state medical programs.

In the national aspect of the legislative program, it has been gratifying to have an administration in Washington that has heen considerate and somewhat favorable to organized medicine, particularly in its fight against socialized medicine. It is true the Bricker amendment concerned with international treaties failed to pass with the required two-thirds vote; nevertheless, for the present, at least, there appears to be no great imminent danger or concern because of this. The Bricker Resolution undouhtedly to many presented rather confusing views. This was brought about by the administration's stand in reversing its support for the reso-lution, along with a prominent physician of an adjoining state who came out flatly against the resolution and the A.M.A.'s concern. The state auxiliary continued its support, however, of the American Medical Association's stand of being in favor of a constitu-tional amendment along the lines proposed by Senators Bricker and George. According to the A.M.A. Washington letter of

March 5, 1954: "It (the A.M.A.) points out that without a change in the Constitution, the social structure of the country, including the practice of medicine, can be altered by international agreements which can become domestic law even without enactment of Congressional legislation." Further, hecause of a motion to reconsider the amendment, the Bricker plan could once again be revived during this session. The Woman's Auxiliary should then be ready to help the A.M.A. in whatever action they wish to take at that time. Other national legislative topics which will be watched with great interest by the Woman's medical auxiliary have been listed by the secretary of the committee on legislation of the A.M.A. for the 1954 legislative program, and are as follows: Medical benefits for veterans with non-service-connected disabilities; Universal military training; extension of Title 11 of the Social Security Act to include physicians and about 10½ million other self-employed persons; Federal aid to private health insurance plans; Tax deferment for premiums for private pension plans; dependent medical care and its effect in connection with the doctor draft law; free hospitalization henefits for beneficiaries under the Old Age and Survivors Insurance Act; Federal aid to medical education; and permanent and total disability insurance benefits.

MRS. CHARLES A. ARNESON, Chairman

#### Press and Publicity Report

Four News Letters have been published this year: November, January, February, and March. The response from all the 10 districts to my request for news has been good.

Along with the social items and the district activities, articles on various recent developments in medical and current affairs of interest to the members have been published. These articles were written by memhers of the auxiliary

MRS. G. G. THORGRIMSEN, Chairman

#### Nurse Recruitment Report

Although very few districts returned my questionnaire, 1 will try to give you an over-all picture of what is being done. Our primary objective this year was the organizing of "Future Nurses Clubs." There are at present, as far as 1 know, 2 in the state—

at Jamestown (organized by Sister Carita) and at Elgin.

However, 1 do feel that in all districts there is an interest in recruitment. In some the auxiliary provides transportation for recruitment teams from hospitals. Others talk to, or provide speakers for, senior classes to interest them in nursing; others provide hrochures and pamphlets to high schools, some have shown films,

of which quite a number are available in the state.

Last May we had "Girls in White" from national, which was

shown to a large number of high school girls.

At Elgin we have shown "For you to Choose," "This Way to Nursing," "Careers in Nursing," "Cirls in White," and "Beyond the Line of Duty.'

Thanks to the efforts of the recruitment chairman at Grand Forks, the possibility of doing something for nursing at "Girl's State" is being taken under advisement by that group.

We are encouraging our local TV station to use the "Nurse Recruitment Television Kit."

With the help of our state nurse enrollment committee, 1 am trying to compile a list of all available nursing scholarships in the state. Through this committee we have also made available many tracts and pamphlets to all high schools in the state. We also furnish speakers at "Career Days" programs throughout the state to acquaint the students with nursing and its opportunities.

At present in Elgin we are raffling a hand-knit stole to raise money for the nursing loan fund.

I would like to suggest that as a group—at convention time, we might sponsor some fund raising project as a raffle, white elephant sale, apron bazaar, or what-have-you. Or, if it seems more feasible, possibly each group would prefer to have its own project—perhaps a cook-book. Let me assure you that the good will we would thus engender by promoting some such fund raising project would be immeasurable.

It would surely do much to establish a feeling of good will and understanding between the nursing organizations and our auxiliary, which perhaps, after all, should be our prime objective.

Nor do I think it too presumptuous to hope that in the future a Nursing Loan Fund might become a state-wide project of the auxiliary.

GENEVA JACOBSON, Chairman

#### Rural Health Report

The rural health council of the North Dakota State Medical Association held a meeting in Dickinson on October 27, 1953. The state chairman of the auxiliary committee was unable to

An excellent report on rural health in North Dakota was given by Mrs. Stephen C. Bacheller, president-elect. A delegate to the national convention of the auxiliary to the A.M.A. in New York City, June 1953, she was called upon in connection with the panel discussions on programs, legislation, public relations and Today's Health. Quoting from our November 1953 Newsletter: "It was gratifying to be able to report that our state is in en-

"It was gratifying to be able to report that our state is in enviable position from the standpoint of rural health.

"We have 1.3 doctors and 5.4 hospital beds per 1,000 people which is considered sufficiently high. We have an excellent public health setup and above average health standards. The Indian population of 14,000 is, from a medical standpoint, adequately taken care of. We have a blood bank which is unique in the United States in that it has developed a satisfactory whole blood distribution system along with its processing plasma. Our mobile x-ray unit took 64,000 films of the chest in 1952. We have an active Blue Cross and Blue Shield organization which is growing rapidly. I was proud to be able to report favorably on Rural Health in North Dakota."

The Grand Forks medical auxiliary rural health committee members assisting are Mrs. Nelson A. Youngs and Mrs. C. B. Porter.

MRS. G. D. GERTSON, Chairman

#### Historian's Report

The historian's book is up-to-date with clippings concerning state medical organization, its auxiliary, and our members in connection with other interests in the community.

Clara M. Halliday, Chairman

#### Civil Defense Report

The material sent out by Mrs. William Mackersie, chairman of the national civil defense for the auxiliary to the medical association, has been given to all our district presidents to present to their groups.

The following outline is given for our activity:

1. Education Program:

Auxiliaries should present information to memhers through (a) study clubs, (b) speakers, and (c) TV and radio programs Participation Program:

(a) Work with civil defense director and find how needs may he served by volunteer registration, (h) Recrnit and register auxiliary memhers in local defense organizations, (c) National Blood Program—assist with blood banks and in blood typing, and (d) fingerprinting—assist, if project undertaken for civilian

GRACE NIERLING, Chairman

#### **Bulletin Report**

There has been an increase in Bulletin subscriptions, which brings North Dakota's total to 55. What should we do to increase it to a 100 per cent rating?

PENNY JOHNSON, Chairman

#### "Today's Health" Report

I am sorry to say our Today's Health record this year is not as am sorry to say our *Today's Health* record this year is not as good as it was last year. Last year, we ended up with a total of 138 subscriptions or credits, 60 per cent of our quota, 232. Our quota is based on one subscription per member according to the previous year's memberships. So this year our quota was 245, which our national *Today's Health* chairman calls very small, but in North Dakota it seems to be very large as we have ended up, according to my figures, with 117 subscriptions. Here are the figures, broken down into districts:

District   Quota   Credits   Percentage	ngares, protein down into distinct	•		
Devils Lake District         13         33         253%           Grand Forks         53         22         42%           Kotana         10         11         110%           Northwest District         24         22         92%           Sheyenne Valley         10         5         50%           Sixth District         40         8         20%           Southwest District         16         16         100%           Stu'sman         17         —         —           Traill-Steele         8         —         —           State Totals and Percentage         245         117         48%	District	Quota	c Credits	Percentage
Grand Forks         53         22         42%           Kotana         10         11         110%           Northwest District         24         22         92%           Sheyenne Valley         10         5         50%           Sixth District         40         8         20%           Southwest District         16         16         100%           Stu'sman         17         —         —           Traill-Steele         8         —         —           State Totals and Percentage         245         117         48%	First District	. 53		
Kotana         10         11         110%           Northwest District         24         22         92%           Sheyenne Valley         10         5         50%           Sixth District         40         8         20%           Southwest District         16         16         100%           Stut'sman         17         —         —           Traill-Steele         8         —         —           State Totals and Percentage         245         117         48%	Devils Lake District	. 13	33	253%
Kotana         10         11         110%           Northwest District         24         22         92%           Sheyenne Valley         10         5         50%           Sixth District         40         8         20%           Southwest District         16         16         100%           Stu'sman         17         —         —           Traill-Steele         8         —         —           State Totals and Percentage         245         117         48%	Grand Forks	. 53	22	42%
Sheyenne Valley         10         5         50%           Sixth District         40         8         20%           Southwest District         16         16         100%           Stu'sman         17         —         —           Traill-Steele         8         —         —           State Totals and Percentage         245         117         48%			11	110%
Sheyenne Valley         10         5         50%           Sixth District         40         8         20%           Southwest District         16         16         100%           Stu'sman         17         —         —           Traill-Steele         8         —         —           State Totals and Percentage         245         117         48%	Northwest District	. 24	22	92%
Sixth District       40       8       20%         Southwest District       16       16       100%         Stu'sman       17       —       —         Traill-Steele       8       —       —         State Totals and Percentage       245       117       48%			5	50%
Southwest District         16         16         100%           Stut'sman         17         —         —           Traill-Steele         8         —         —           State Totals and Percentage         245         117         48%			8	20%
Stutsman     17       Traill-Steele     8       State Totals and Percentage     245       117     48%			16	100%
State Totals and Percentage 245 117 48%			_	
	Traill-Steele	. 8	_	_
	State Totals and Percentage	245	117	48%
		IRS. J.	H. MAHONEY,	Chairman

#### Student Loan Fund Report, 1953-1954

Devils Lake (12 members)	 \$ 66.00
First District (55 members).	 175.00
Grand Forks (58 members)	 363.00
Kotana (11 members)	 55.00
Northwest (30 members)	 195.00
Sheyenne Valley (10 members)	 15.00
Sixth District (37 members)	 400.00
Southwest (18 members)	32.00
Stutsman (21 members)	 75.00
Traill-Steele (7 members)	 29.00

#### Auxiliary President's Report-First District

Total (259 members) .....

The auxiliary to the First District medical society has held 4 meetings in the past year (1953-1954) as is customary. Since it

\$1,405.00

is the wish of the group to keep on a social level rather than a working one, the meetings were planned accordingly. Each meeting was a dinner meeting held at the same time and place as that of the society. At our first meeting we had a speaker from the National Foundation for Infantile Paralysis; at Christmas time a review of the play, "Aamahl and the Night Visitors." At our January meeting we were privileged to be hosts to our state president, Mrs. Henry Kermott, Jr. The year closed with a travel talk by Mrs. Joel Swanson.

Our Auxiliary presented \$25 to the March of Dimes Fund, actively supported an extensive fight for fluoridation, and raised about \$125 for the student loan fund by a bake sale and dona-

There are 54 members in our auxiliary.

MRS. RALPH WEIBLE, President

#### Auxiliary President's Report-Second District

We held 4 meetings this term and because of poor weather. we did not have election of officers at the last one, and it was finally decided that the present officers should stay in until the fall meeting.

We have done very well on Today's Health, or rather Mrs. Mahoney has—34 subscriptions have heen sold, and we doctors wives who have them see that they are placed in our husbands' waiting rooms or the school library.

As for The Bulletin, all of our members subscribe to it.

As for nurse recruitment, our auxiliary sponsored and served a tea with a fashion show for the nurses last fall when they held their state convention in Devils Lake. As a group we have not shown movies but each of us has worked in her community to encourage high school girls to enter training.

Our special project is the student loan fund. This year our members each held a progressive hridge party, levying \$1.00 on each of our friends who were invited. So far \$66 has been received and it is not all in. Our goal every year has been \$100.

Mrs. C. A. Corbett, President

#### Auxiliary President's Report—Third District

The Grand Forks auxiliary to the district medical society has 58 members in good standing, 5 of whom are associate members. This includes 100 per cent membership within the confines of the city of Grand Forks.

We have had 4 dinner meetings this year and the programs have been varied and most interesting. The first was an illus-trated lecture on "The Why and What of Civil Defense" by our local director. This was augmented with a movie shown by two air force officers from Fargo. Musical programs and the showing of the colored pictures of Dr. and Mrs. Young's trip to Europe last

summer comprised our entertainment for the other meetings.

This group was represented in the Armistice Day "Parade of Flags," a very fine civic patriotic pageant which was given at the field house at the university before several thousand people.

We were most happy to have our president, Mrs. Kermott, visit us in January. Due to convention plans all of our group was not privileged to meet with her, and she met only with the chairmen of the various committees at an informal dinner at my home. All are looking forward to meeting her at the convention.

A beautifully appointed tea and a food sale was our first project for the medical student loan fund for which we made We didn't feel this was adequate, and wanted to do much more to support the enthusiasm of our new dean of the medical school and his particular interest in this project. The amount will be an-

nounced later, pending the number of contributions.

We have been asked by "The Campus Medical Group" to take a more active part in the affairs of that organization, as wives of the physicians who assist with the teaching at the university. This group was organized after the death of Mrs. French, wife of the former dean of the medical school, to perpetuate the tea given annually for the medical students by Dr. and Mrs. French.

Dean Harwood asked for workers from the auxiliary to give assistance to the Cancer Caravan during its stay here the first part

of April.

There were 18 renewals and 3 new subscriptions to Today's Health. There were 9 renewals and 5 new subscriptions for The Bulletin.

The following officers were elected for the 1954-1955 year; President, Mrs. Harry D. Benwell; vice-president, Mrs. James D. Cardy; secretary, Mrs. James Leigh; treasurer, Mrs. John Sandmeyer; and councillor, Mrs. G. D. Gertson.

MRS. R. O. GOEHL, President

#### Auxiliary President's Report-Fourth District

president of the Northwest District medical auxiliary of North Dakota, I wish to submit the following report.

This auxiliary consists of 29 memhers and during the year we have had 6 meetings, meeting on the same evenings as the doctors of the district.

Outstanding among our activities this past year were the successful sales of handwork made by San Haven patients, the entire proceeds of which were returned to the patients in order that they might purchase more materials to occupy their time during their stay at the sanatorium.

The auxiliary has sponsored Today's Health and 16 subscriptions were sold.

At the September meeting, Mrs. Martin Conroy read the interesting article "The Educated Heart" by Dr. Kenneth McFarland. Dr. McFarland gave this address at the National Medical Auxiliary Convention in New York this summer and it appeared in the last issue of The Bulletin.

At the October meeting, Dr. R. T. Gammel of Kenmare gave a most interesting talk on "Mexican Bird Life." Ile also showed

many beautiful colored slides.

At the January meeting, Mr. IIal Pufall, instructor in the speech department at the Minot State Teachers' College, gave a very interesting talk on the medical and surgical aspects of speech defects and told what progress is being made in correcting them.

At the February meeting, we had an open discussion on how

to raise money for the student loan fund.

At the March meeting, Mr. Vernon Fahy, chairman for the civil defense of Ward County, gave an excellent talk on the importance of home defense. Mr. John Herner, state highway patrolman, showed a film in conection with the program. As the of this excellent and inspiring program, many of our members signed up for the "sky watch" in progress here in Minot.

At the April meeting, Mr. William Sullivan, of the Floral Shop,

gave a talk on the care of house plants and also a demonstration

of flower arrangements.

Members of this auxiliary have served refreshments to the hospital auxiliary, participated in school panel discussions, assisted in the Mothers' March of Dimes, attended the National Foundation for Infantile Paralysis meetings and numerous other activities in the interest of their community.

We have contributed \$195 towards the student loan fund.

I am indeed grateful to all of the members of this auxiliary for their fine cooperation. We have learned that by some work and some play together, much can be accomplished, hoth for the good of the community and for the promotion of happier relations among the medical families.

MARY W. DEVINE, President

#### Auxiliary President's Report-Fifth District

The Women's Auxiliary to the Sheyenne Valley medical society has a membership of IO. No members were lost in the past year, and there are 4 prospective members.

Our meetings, 4 in number, have been of a social get-together at the various homes. Our lunch money at these occasions is the nucleus for our contribution to the student medical loan fund.

The members have assisted with Red Cross, Blood Bank, X-ray mobile unit, and the Polio drive when called upon.

Several of our members give their help in making weekly rounds to the hospital patients with the courtesy cart, a project which has been started by the Mercy Hospital auxiliary.

Another member has charge of the traveling library cart, which visits the hospital patients once a week. This service is sponsored by the Valley City Public Library.

Mrs. J. P. Merrett, President

#### Auxiliary President's Report—Sixth District

The Sixth District Auxiliary has an eligible membership of 64, out of which 41 are active memhers. The average attendance has been 25.

In the past the members of our auxiliary have been disap-pointed in the small turnout of the out-of-town members. The vice-president was asked to be membership chairman and to write personal notes to all out-of-town wives-the result has been most gratifying.

We have bad 4 meetings; the first, a social affair; the second, program presented by Sargent Westly Harry from our local Filter Center with a film and a talk on civil defense; our last meeting, an open discussion on ways and means of raising money for the student loan fund. Our final meeting was held in April, at which time our state president, Mrs. Kermott, was our main speaker and the officers for the coming year were elected.

On March 20, a silver tea and white elephant sale was held at the home of Mrs. H. R. Waldschmidt. She happily reported that the sum of \$313.06 was raised for the student loan fund. The rest of our \$400 came from the raffling of the center piece at each meeting and the generous donation of \$25 from Mrs. The Elgin group knit a pink wool stole which they DeMoulle. raffled. That netted \$67.25.

Six of our members are active workers at the Filter Center and others plan to start soon. Many have signed up for other duties

in case of national emergency.

In public relations and community health-I cannot give enough praise to the conscientious work done by our members in aiding the Red Cross in the blood bank, the TB mohile unit, the preschool clinic, March of Dimes, Community Chest, Cancer program, Mental Health, and other worthwhile organizations.

We have sold 11 subscription to The Bulletin. Mrs. Brink attended the institute on nurses recruitment, and re-

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ports that future plans are made to work with the Lewis and Clark district nurses association on this project.

The Today's Health committee reports the sale of 13 subscrip-

MRS. CARL BAUMGARTNER, President

#### Auxiliary President's Report-Seventh District

The Stutsman County Woman's Medical Society, which is the Seventeenth District Society, had 4 meetings during the year 1953-54.

On October 29, 1953, a dinner meeting was held. Mr. Dale Mattison, business manager of the State Hospital at Jamestown, gave a talk and showed colored slides of a recent tour of the hospital. Because of the controversies at the hospital at that time, these films were of special interest. Wives of all the doctors at the hospital were our guests.

On December 10, 1953, our Christmas party was held at the home of Mrs. P. G. Arzt. Dr. Joseph Sorkness, president of the North Dakota Medical Association, was our guest speaker. We learned the North Dakota State Medical Association was founded in Larimore, North Dakota in 1887 with 6 members, and that it now consists of 360 active members and has component district societies embracing the entire state.

The primary purpose of the association is to improve the caliber of medicinc practiced in this state, so that our level of practice

compares favorably with the best in the nation.

Dr. Sorkness mentioned the rural health committee, under the able chairmanship of Doctor Jacobson of Elgin, which is concerned with the distribution of physicians, the public health in rural areas, and the provision of hospital facilities. Marked improvement in rural care has occurred since 1945.

Through their economics committee, voluntary health insurance plans have been encouraged, formulating a uniform insurance report form and an equitable schedule of welfare fees for our

state.

Dr. Sorkness also told about their medical education committee, which has been active in promoting scholarships for our medical school. This committee is also cooperating with our dean in the medical school in his efforts to improve the school and eventually found a class A four-year school. Donations by the profession to the American Medical Education Foundation are made, and these funds in turn are passed on to the medical school. He stated in this connection that our auxiliary has been most helpful by establishing a revolving loan fund at the university which has been used to the fullest. He said that our ladies have also taken part in their annual medical press meeting and probably served our highest purpose in improving public relations between the medical profession and the public. The Stutsman County Auxiliary is grateful for having had the opportunity of hearing Dr. Sorkness.

It is customary at our Christmas party to sponsor a needy family. Members contributed canned goods, clothing, and money to amply supply a very large basket. Three new members were wel-

comed at this time.

On March 18, 1954, our meeting was held at the Crippled Children's School. After our business meeting, we were taken on a tour of the school, then entertained by the school chorus, which was followed by a delicious luncheon served by Dr. Anne Carlsen.

Our final meeting was held April 22, 1954, at the home of Mrs. John W. Jansonius. At this time the auxiliary voted to sponsor a Nurse Recruitment Club. Elected officers for the ensuing year were: Mrs. Robert L. McFadden, president; Mrs. John M. Van der Linde, secretary-treasurer; and Mrs. Robert E. Lucy,

Our project for this year was the student loan fund, and it was taken care of by cash contributions from the individual members. A check for \$75 has been mailed to Mrs. C. J. Baumgartner.

Our auxiliary has 8 subscriptions to Today's Health and 1 to The Bulletin.

The Stutsman County Auxiliary totals 22 members, including wives from Jamestown, Edgeley, and Oakes. We have 3 new members this year and the reinstatement of a former member, also a social member, Mrs. Russell O. Saxvik. Her active membership is from Picare 1.

ship is from Bismarck.

We are proud of our Mrs. P. G. Arzt, who, with the assistance of Mrs. John W. Jansonius, compiled a History of the Auxiliary to the North Dakota State Medical Association for the Auxiliary

Happy to mention that practically all our members have taken a very active part in contributing to the efforts of the cancer drive, polio, and Red Cross. Our Mrs. E. J. Larson is commander for the Stutsman County Cancer Unit and was in charge while the mobile unit visited Jamestown.

MRS. GEORGE H. HOLT, President

#### Auxiliary President's Report-Eighth District

The annual meeting was held in February 1954, with 11 members present, including 1 new member, Mrs. R. Froeschle of Tioga. The dues, amounting to \$33, were collected.

Mrs. J. D. Craven was appointed delegate to the state convention in Grand Forks.

It was decided to donate \$55 to the student loan fund.

Last year's Today's Health chairman, Mrs. C. Lund, reported Last year's Today's Health chairman, Mrs. C. Lind, reported that 6 gift subscriptions to the magazine bad been given by our group, 1 to each of the following: James Memorial Library, Williston High School Library, Mercy Hospital, Good Samaritan Hospital, St. Luke's Hospital, Crosby, and Watford City Hospital.

At this meeting it was decided to renew these subscription for the following year. In addition to these, the new chairman for Today's Health, Mrs. J. D. Craven, took 5 new subscriptions from the members, making a total of 11.

the members, making a total of 11.

The new officers elected for a term of two years are: president, Mrs. E. J. Hagan; vice-president, Mrs. J. P. Craven; secretary-treasurer, Mrs. C. Lund; publicity, Mrs. D. E. Skjei; public relations, Mrs. Joan Hagan; program, Mrs. D. F. Pyle; Today's Health, Mrs. J. D. Craven; councillor, Mrs. W. A. Wright; and civil defense, Mrs. J. J. Korwin.

Several memers have taken part in the following community activities, the Cancer Drive, Chest x-rays, March of Dimes, Crippled Children's Clinic, Red Cross Drive, and the Blood Bank.

Mrs. J. C. Korwin, President

#### Auxiliary President's Report-Traill-Steele District

As those of you long associated with auxiliary work know, our Traill-Steele District Society is quite inactive except as a social group. We have been so for many reasons—small membership, inability to get around successfully in winter, and others. However, we do try to keep up with projects taken by the auxiliary as a whole, and we are ever on the lookout for new members.

I shall list projects as you mentioned them:

Bulletin-order blanks sent to all members-few responded. Today's Health—blanks distributed—few placed in offices, but general opinion was that at present there were enough of that

Nurse recruitment—brought to attention of members—all trying in one way for local hospitals. It was my pleasure to talk to senior girls on subject as possible vocation to enter.

Student loan fund—brought to attention of members.

Membership-we have a total membership of 7, took in 1 new member, and are trying for 2 more.

Number of meetings—4 per year, 2 in fall, and 2 in spring.

Programs—we join our husbands for a dinner meeting, then go to one home for our meeting, and are joined again by the men for coffee after their meeting. Our one highlight of this year was our October meeting, at which Dean Harwood, of the North Dakota University medical school, was present and also Lyle Limond, executive secretary. They later joined us and were entertained in our home. All of our members enjoyed meeting those two personages well known in medical circles.

As you see, we are small in number, but we do enjoy the contact we have as auxiliary members, and perhaps one day we will be able to partake of more work, and actually be more active memhers. It is a fine association, and we are always proud of

our larger auxiliaries and their work.

SALLY VANDERGON, President

Motion was made by Mrs. Berg that we adopt the reports. Motion was seconded and carried.

After the reports were accepted, Mrs. Schulte praised the outstanding work that our auxiliary was doing. She also stressed the importance of our subscribing to the improved Bulletin.

Mrs. Berg then read a proposed change in the sophomore student loan fund constitution. It was as follows: "Candidate shall make application in writing to the chairman, standing committee on student loans and grants, preferably six weeks before but not later than one week before commencement exercises." Motion was made by Mrs. Arneson that we accept this change. Motion was seconded and carried.

Since the state medical society felt and had passed a motion that they could no longer support our news letter, a budget committee composed of Mrs. Berg and Mrs. Benwell was appointed to study and make recommendations on a revised budget. Much discussion followed about an increase in state dues and the publication of fewer news letters. Motions on these two matters were

Mrs. Kermott then appointed Mrs. V. J. Fischer, Mrs. C. A. Arneson, and Mrs. C. D. Gertson on the auditing committee.

Mrs. Kermott then introduced Dean T. H. Harwood, University of North Dakota medical school. He mentioned the difficulty medical students encounter in securing loans, and how much our sophomore student loan fund was needed and appreciated.

Mrs. Kermott then introduced Dr. W. E. G. Lancaster who spoke to us about the American Medical Education Foundation and the American National Education Foundation. He stated that our medical schools were in a rather critical financial situation, and compared the cost to the medical schools in educating a doctor to the actual cost to the doctor. He cited numerous statistics to impress upon us just how important it was that we urge the doctors to contribute to the American Medical Education Fund. In turn, the American National Education Foundation, financed by industry, will contribute a corresponding amount.

These two sources will then be channeled into the medical schools. In closing, he stated that he was sure we would increase our contributions in this state if the need was known and realized.

Meeting adjourned to reconvene at 2:30 p.m., medical school

auditorium, University of North Dakota.

A delightful huncheon was held Monday, May 3, in the ball-room of the student union, University of North Dakota, with Mrs. R. O. Goehl presiding.

The convention reconvened at 2:30 p.m., May 3, 1954. The meeting was called to order by Mrs. Henry Kermott, president.

Mrs. G. G. Thorgrimsen, chairman of the nominating committee, then submitted the following report:

#### Nominating Committee Report

President-Mrs. S. C. Bacheller, Enderlin President-elect-Mrs. J. II. Mahoney, Devils Lake First vice-president-Mrs. C. A. Arneson, Bismarck Second vice-president-Mrs. G. H. Holt, Jamestown Recording secretary-Mrs. J. W. Jansonius, Jamestown Treasurer-Mrs. V. J. Fischer, Minot

Mrs. Kermott then asked for nominations from the floor for these offices. As there were none, she asked for a motion nominating the slate of officers. It was moved by Mrs. Liebeler that we instruct the secretary to cast a unanimous ballot for the entire slate of officers. Motion carried.

After much discussion, we agreed that we should not decrease our 4 news letter publications.

The registration committee reported there were 94 registrants. Mrs. Kermott asked that all bills be presented to the convention as soon as possible.

Mrs. John M. Van der Linde, Jamestown, and Mrs. F. A. De-Cesare, Fargo, were chosen as delegates to the national convention to be held in San Francisco in June.

Meeting then adjourned.

A delightful banquet was held Monday, May 3, 6:30 p.m. in the Nodak Room, Ryan Hotel, with Mrs. V. S. Quale presiding.

A few numbers from the Flickertail Follies were given.

Then, Mrs. V. S. Quale introduced our honored guest and speaker, Mrs. Raymond Schulte, national second vice-president,

Spokane, Washington.

She started her address by saying that every family should have a family physician. She quoted statistics to show how our organization had grown and what a far reaching organization it was. She gave us the slogan "Together we progress" of our national president, Mrs. Leo J. Schaefer. She stressed the importance of our duties as doctors' wives to belong to the organization defeating socialized medicine. She also stressed our part in public relations—not to hide our light under a hushel—tell the world about it in gaining friends for medicine. She thought we should justify ourselves as an auxiliary by taking a vital interest in elections. We must go along with the 140,000 mcmbers of A.M.A. in defeating free medicine. We act as the liaison between the public and the doctors. She suggested that we should work contantly to support the American Education Foundation, because if the government supports medical institutions, it also can control.

She thought we should do our duty to foster nurse recruitment, civil defense, and promote the sale of Today's Health.

She cited numerous statistics to show how much living costs

had risen; yet, medical costs had not risen proportionately.

She closed by saying: "If you lcave foot prints in the sands of time, you must wear work shoes."

Our last business session and social program was a brunch at

the Grand Forks Country Club, Tuesday, May 4, at 10:00 a.m. Mrs. H. D. Benwell presented Dr. P. H. Woutat, president of the North Dakota State Medical Association. He gave a short address in which he stressed that one of our most important roles as an auxiliary was public relations.

Mrs. Benwell then introduced Mrs. Hoghaug who sang several

delightful numbers.

She then introduced and thanked the following committee convention chairmen: registration, Mrs. J. H. Moore; finance, Mrs. Grinnell; transportation, Mrs. H. O. Ruud; table decorations, Mrs. . S. Quale and Mrs. Hamre; luncheon, dinner, and brunch, Mrs. Henry Ruud, Mrs. P. H. Woutat, and Mrs. W. A. Liebeler; chairman of special courtesy to the guests, Mrs. G. G. Thorgrimsen.

The auditing committee then stated that the books were in order

up to April 30, 1954.

Mrs. V. J. Fischer then read the following proposed budget for 1954-1955:

#### Income

(\$1.00 increase in state dues) . State medical association (toward convention expenses)	\$750.00 200.00
	\$950.00
Proposed Expenditures	
President:	
1. National convention	\$250.00
2. Board meeting	
3. Discretionary fund	. 50.00
4. Miscellaneous	. 15.00
President-elect:	
I. Board meeting	\$100.00
Standing committees	25.00
News letter and stationery	
Miscellaneous	
Convention	

Mrs. G. D. Gertson moved that we adopt the hudget. Motion was seconded and carried.

The following resolutions report was read:

#### Resolutions Report

Whereas, the president, Mrs. Henry Kermott, Jr., has served the Woman's Auxiliary to the North Dakota State Medical Association faithfully and well; and

Whereas, under her leadership a prosperous and successful year

has heen enjoyed, and

Whereas, her efforts have led to wider recognition of the Woman's Auxiliary to the North Dakota State Medical Association, therefore be it

Resolved, that the Woman's Auxiliary to the North Dakota State Medical Association, in convention assembled in Grand Forks, May 4, 1953, extend to Mrs. Henry Kermott its heartfelt thanks and sincere appreciation for the great service that she has rendered to that group.

II.

Whereas, the Woman's Auxiliary to the North Dakota State Medical Association has held its eighth annual meeting in Grand

Whereas, the Woman's Auxiliary to the Grand Forks Medical Society has served as hostess during the meeting and has performed the function so admirably, and

Whereas, the North Dakota State Medical Association and the Grand Forks medical society have assisted in this convention, and Whereas, the manager of the Dacotah and Ryan hotels and staff have provided excellent accommodations and service, and

Whereas, the University of North Dakota for their gracious extension of hospitality, and

Whereas, the Grand Forks Herald for their courtesies and publicity, and

Whereas, Mr. Lyle A. Limond, executive secretary for the North Dakota State Medical Asociation, for his continued efforts in our behalf and his promise of future assistance, and Whereas, Dr. Philip H. Woutat, Grand Forks, president-elect,

for his presence and inspiration, and

Whereas, to Mrs. Raymond Schulte, National second vice-president, Vancouver, Washington, for her presence and gracious assistance rendered this eighth annual meeting, and Whereas, to Mrs. D. J. Halliday for preparing the very interest-

ing scrapbook for the eight-year historical events of the auxiliary,

Resolved, that the Woman's Auxiliary to the North Dakota State Medical Association extend a vote of thanks

Mrs. J. S. Sorkness, Chairman Mrs. Raymond Schulte then congratulated the incoming officers on their new duties, and installed them in their offices.

Mrs. Henry Kermott turned over the files to Mrs. Bacheller. Meeting was then adjourned.

#### Postconvention Minutes

Mrs. S. C. Bacheller called the meeting to order. She stated her theme for the year was going to be "Know Your Auxiliary." then thanked the auxiliary for selecting her as its president.

Some suggestions were then made for programs for the year. Each district auxiliary was asked to submit the names of their officers so proper distribution of material could he made.

#### 1954 MEMBERSHIP ROSTER

#### WOMAN'S AUXILIARY TO THE NORTH DAKOTA STATE MEDICAL ASSOCIATION

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Wicks, Mrs. Fred L 7.	26 Chautaugua Blvd., Valley City

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	911 Ave. C West, Bismarck
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Larson, Mrs. Ernest J
Lucy, Mrs. Robert E 420 4th Ave. S.W., Jamestown
McFadden, Mrs. Robert L 910 3rd Ave. N.W., Jamestown
· Miles, Mrs. James V 722 6th Ave. S.E., Jamestown
Nierling, Mrs. Richard D 415 9th St. S.E., Jamestown
Pederson, Mrs. Thomas L 416 4th Ave. N.E., Jamestown
Place, Mrs. B. A Box 476—State Hospital, Jamestown
Sorkness, Mrs. Joseph 318 3rd Ave. S.E., Jamestown
Van der Linde, Mrs. John 502 3rd Ave. S.W., Jamestown
Van Houten, Mrs. R. W Oakes
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Woodward, Mrs. Floyd O 722 3rd St. N.E., Jamestown
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# GANTRISIN CREAM Roche'

# for vaginal use

Gantrisin Cream offers a three-fold advantage in the prophylactic and therapeutic management of vaginitis, cervicitis, vulvitis and related gynecologic disorders:

 wide antibacterial spectrum, plus high solubility, plus low incidence of sensitization.

2. acid pH (4.6) providing unfavorable medium for vaginal pathogens.

 aesthetic appeal—pleasant white vanishing cream.

Dosage and Administration: from one-half to one applicatorful

(2.5-5 cc) introduced into the vagina twice daily (in the morning and upon retiring).

**Supplied:** 3-oz tubes, with or without applicator.

Caution: If patient develops sensitization, treatment should be discontinued.

GANTRISIN®—brand of sulfisoxazole (3,4-dimethyl-5-sulfanilamido-isoxazole)

# American College Health Association News . . .

Dr. John Scott has been appointed director of the health service at Montana State University, Missoula. The announcement of this appointment came to the secretary's office from dean of students, H. J. Wunderlich.

Springfield College, Springfield, Massachusetts, is planning to redesign their infirmary facilities. A committee has been appointed to modernize present arrangements in light of current trends in modern college health facilities.

Dr. Ray A. Moore, college physician at Hampden-Sydncy College, Hampden-Sydney, Virginia, has informed the secretary's office that plans are being made to convert a gymnasium into a college infirmary.

Dr. Arlie Bock, director of the health service at Harvard University, was given an honorary Doctor of Science degree by Harvard University at the June commencement. He was cited as follows: "A grateful patient honors her physician of three decades, whose human sympathy has been devoted to both the sick and the well." The reference to "both the sick and the well" is particu-

larly apt because it gives strong tribute to the preventive and health building aspects of student medicine.

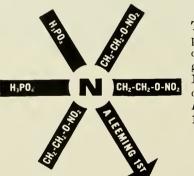
Four rooms have been added to the health service quarters at Wayne University adjacent to the original health service space in the Student Center Building. The new rooms will be used to group the mental hygiene counsellors into a more convenient and efficient location. The rooms freed by this move will be used for auxiliary staff consultations with specialists.

The secretary's office is in receipt of information which we can mention only briefly because complete details were not available. We hope to be able to publish a full account in a future issue:

Lehigh University has raised over half a million dollars for a new Student Health Building. A donor contributed \$250,000 and the university matched that amount.

Columbia University will open its new health service quarters at the beginning of the fall term of school. Quarters are located in a new wing of St. Luke's Hospital. We have asked Dr. Wise to send us a report for publication.

# Angina pectoris prevention



The new strategy in angina pectoris is prevention, the new low-dose, long-acting drug—METAMINE. Most effective milligram for milligram, and better tolerated, METAMINE prevents attacks or greatly diminishes their number and severity. Dosage: 1 tablet (2 mg.) after each meal; 1-2 tablets at bedtime.

Thos. Leeming & Co. Inc.
155 EAST 44th STREET, NEW YORK 17, N.Y.

# Metamine

Triethanolamine trinitrate biphosphate, Leeming, tablets 2 mg. Bottles of 50 and 500. Upjohn

oral
estrogen-progesterone
effective in
menstrual disturbances:

Each scored tablet contains:

Estrogenic Substances\* .. 1 mg. (10,000 I.U.)

Progesterone ......30 mg.

\*Naturally-occurring equine estrogens (consisting primarily of estrone, with small amounts of equilin and equilenin, and possible traces of estradiol) physicalization equivalent to 1 mg. of estrone.

Available in bottles of 15 tablets.

The Upjohn Company, Kalamazoo, Michigan



# Cyclogesterin tablets

The Action of Insulin, by Niels HAUGAARD, PH.D., and JULIAN B. Marsii, M.D., Springfield, Illinois: Charles C Thomas \$3.75.

In this monograph, the authors have attempted a survey of the current state of knowledge of the problem of the mechanism of insulin reaction. The intention to attract the attention of the clinician as well as research worker has been well achieved. The complicated nature of the problem of the action of insulin is shown by the concept that it has become one of the interreaction of hormones with enzyme systems. Their secrets will be revealed in time to the researcher. This monograph is worthy of consideration because of the theory presented.

C. A. McKinlay, M.D.

The Biochemistry of Clinical Medicine, by WILLIAM S. HOFFMAN, M.D., 1954. Chicago: The Year Book Publishers, Inc. 681 pages.

The author's avowed purpose is to explain recently accumulated biochemical data for the use of the general practitioner for diagnosis,



prognosis, and treatment of disease. At the same time, the information is intended to be sufficiently thorough to serve for review of the basic sciences in preparation for examinations of the several American specialty boards. Generally these objectives have been attained. The author has injected his ideas and interpretations, particularly in what he calls the biochemical dynamics of the disease process. That is, the elements of time and change are considered in appraisal of chemical analyses of body fluids, secretions, and excretions.

The clinical manifestations and implications of the biochemical disturbances are discussed with and

when the changes are described. This coherence of biochemical and clinical material enhances understanding of all phases of a particular subject, and also avoids repetitions and the annoyance of multiple cross references.

The charts, tables, and diagrams are clear and instructive.

The book is not a laboratory manual, but would ably complement such a work, and also textbooks of physiology and pathology. The central target of Dr. Hoffman's book should be the one at which the author has aimed—the general prac-

JAMES B. CAREY, M.D.

Operating Room Technic, St. Mary's Hospital, Rochester, Minnesota, fourth edition, 1952. Philadelphia: W. B. Saunders Co., 345 pages, 219 illustrations, index of illustrated instruments. \$6.50.

The Sisters of St. Francis, at St. Mary's Hospital, Rochester, Minnesota, have rewritten their textbook, The Operating Room - Instructions for Nurses and Assistants, and the result is this invaluable handbook, directly intended for the use of the (Continued on page 384)

## In spastic and occlusive vascular diseases

# **TENSODIN**



Tensodin Tablets 100's, 500's and 1000's

Tensodin®, a product of E. Bilhuber, Inc.

Tensodin is indicated in angina pectoris and other coronary and peripheral vascular conditions for its antispasmodic, vasodilating and sedative effects. The usual dose is one or two tablets every four hours. No narcotic prescription is required.

Each Tensodin tablet contains ethaverine hydrochloride (non-narcotic ethyl homolog of papaverine) 1/2 grain, phenobarbital ¼ grain, theophylline calcium salicylate 3 grains.

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ORANGE **NEW JERSEY** 

#### when infection strikes...

and time is a factor...

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# Tetracycline \*\*Brand of tetracycline\*\*

"... defervescence in temperature is ... rapid with this new drug."

In cases of infectious disease, time is a factor. Reports in a rapidly expanding body of literature emphasize that with Tetracyn therapy in susceptible infections, temperature promptly returns to normal—patients are often afebrile in hours.

Glatt and Ross² report that temperatures of patients with bacterial pneumonia "at the time of initiation of therapy ranged from 99.6 F to 105.2 F.... In 3 children the temperature returned to normal within 24 hours after initiation of therapy [with tetracycline], in 7 within 24 to 48 hours, while only 2 cases required 72 hours before fever subsided."

Whenever you take a temperature, for a prompt response with outstanding toleration—consider Tetracyn in susceptible infections.

- 1. Flippin, H. F.: Philadelphia Med. 49:733 (Jan. 30) 1954.
- Glatt, M., and Ross, S.: Antibiotics & Chemotherapy 4:395 (Apr.) 1954.

\*TRADEMARE

## **Tetracyn**



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536 Lake Shore Drive, Chicago 11, Illinois

CAPSULES
TABLETS (sugar coated)
ORAL SUSPENSION
PEDIATRIC DROPS
INTRAMUSCULAR
INTRAVENOUS
OINTMENT (topical)
OPHTHALMIC OINTMENT

BOOK REVIEWS

(Continued from page 382)

nurse but also very valuable to the surgeon. About 280 surgical procedures are treated individually, giving the necessary information simply and definitely, about as follows: (1) name of operation, (2) definition, (3) position, (4) drape, (5) instruments, (6) drain, (7) suture, and (8) procedure, in which the number of steps varies from 3 or 4 to 16 or more.

The instruments and preparations for the operations are illustrated with very fine drawings and half-tones, besides beautiful illustrations of the anatomy and surgical procedure. Furthermore, the index of instruments, filling 13 pages, enables the nurse to recognize easily any instrument by its correct name.

The routine usc of this book makes the preparation of the operating room, of the instrument tray, and of the patient so clear that all guesswork is eliminated.

For the doctor, a glance at the list of instruments is a very easy way to check preparations, and reading through the steps listed under "Procedure" furnishes an excellent summary of his review of the operation.

While directing attention to this remarkably excellent book, it may

not be amiss to remind our readers of Johnson and Johnson's *Operative Procedure*, which pictures the successive steps of about 100 surgical operations. For some operations, more than one method is illustrated, and the number of pictures varies from 3 to 9.

The illustrations in these two books are so clear and so well plauned that they are admirably suited for purposes of review and final preparation for operating. A book which combined the material in these two books would be invaluable to the general surgeon.

C. W. DEL PLAINE

Disease of the Chest, by T. ROYLE DAWBER, M.D., and LLOYD E. HAWES, M.D., 1952. Baltimore: Williams and Wilkins Co. 440 pages. \$10.00.

This is a fine collection of chapters on diseases of the chest wall, the diaphragm, the pleura, the mediastinum, the heart and the lungs, the trachea, and the bronchi. It contains many reproductions of roentgenograms. It will be of value to all men who have to make difficult diagnoses from such x-ray films, and who are much interested in diseases of the chest.

Walter C. Alvarez, M.D.

Salmonellae and Shigellae. Laboratory Diagnosis Correlated with Clinical Manifestations and Epidemiology, by Alfred J. Well, M.D., and Ivan Sapira, M.D., 1953. Springfield, Illinois: Charles C Thomas, 247 pages, \$6.50.

This book should be helpful to bacteriologists and medical technicians in hospital laboratories who are called upon to isolate and identify pathogenic intestinal bacteria. The book will not be particularly useful to the practicing physician.

The 15 chapters discuss the biologie properties, taxonomy, methods of isolation, cultural identification, and serologic identification of Shigellae and Salmonellac. There are also chapters concerned with the Widal test, borderline pathogens, clinical features and epidemiology, immunity, bacteriophage typing and therapy. The bacteriologic aspects of Shigella and Salmonella infections are thoroughly discussed. The presentation of clinical features is sketchy indeed. There is very little discussion of chemotherapy. Perhaps the most useful feature is the rather thorough discussion of the serologic differentiation of Shigellae and Salmonellae.

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#### NEWS BRIEFS

(Continued from page 386)

A MUSCULAR DYSTROPHY clinic opened August 9 at the University of Minnesota. The clinic, sponsored by the Twin Cities chapter of the Muscular Dystrophy Association of America, is under direction of Dr. A. B. Baker, head of the neurology division of the university. Outpatient care is provided for most patients and inpatient care for selected cases. The clinic is open three and a half days a week.

Dr. J. Arthur Myers, chairman of our board of editors, was awarded an honorary degree of doctor of laws at Ohio University, June 13, 1954.

Dr. Henry A. Johnsen, Jr., who recently completed a fellowship in the section of internal medicine at the Mayo Foundation, has joined the staff of the Lenont-Peterson Clinic at Virginia. Dr. Johnsen is associated in the internal medicine department with Dr. W. S. Neff.

MR. PAUL GRAEBNER, a 1933 graduate of the University of Minnesota college of pharmacy, has joined Geigy Pharmaceuticals as a professional service pharmacist. At present a resident of Minneapolis, Mr. Graebner will continue to headquarter in the city.

#### South Dakota

Two school health workshops under the direction of Dr. Ralph H. Boatman, chairman of the health education department at Southern Illinois University, were held at General Beadle State Teachers College, Madison, July 26 to August 6, and at Black Hills Teachers College, Spearfish, August 9 to 20. Characteristics of good school health were studied with emphasis upon healthful school environment, school health services, and health instruction in schools.

HECLA AND FAITH have been named emergency care areas by the state board of medical examiners. This action makes it possible to assign displaced physicians to these two communities if the towns are unable to secure the services of American-trained physicians.

Dr. John H. Hermanson, a graduate of Creighton University school of medicine, is now practicing in Sioux Falls. Since leaving his private practice in Valley Springs last November, Dr. Hermanson has been taking special study in obstetrics and gynecology at Northwestern Hospital, Minneapolis.

Dr. John P. McCann, a specialist in obstetrics, is now associated with Dr. William G. Rieb in the practice of general medicine at Parkston.

Dr. Willis F. Stanage, who served his residency in pediatrics at the University of Nebraska Hospital and Children's Memorial Hospital, Omaha, joined the Yankton Clinic July 1.

## Deaths . .

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Dr. Harry J. Gowenlock, 73, assistant superintendent of the North Dakota State Hospital at Jamestown, died July 3. Dr. Gowenlock practiced medicine in Gardner from 1904 until 1946, when he became staff physician at the state hospital.

Dr. William J. Noonan, 44, Minneapolis physician, died July 21 of a heart attack. Dr. Noonan was a staff

member of St. Barnabas, Abbott, and Midway hospitals, and on the teaching staff of the University of Minnesota medical school.

Dr. M. W. H. Bockman, 75, former Hennepin county coroner and school physician, died July 29 at Hot Springs, Arkansas.

DR. WILLIAM H. HENNEY, 76, a physician in McIntosh, Minnesota for thirty-five years, died July 19. Dr. Henney was mayor of the town for twenty-three years and health officer for thirty years.

#### OBSERVATIONS ON INSULIN REQUIREMENT IN KIMMELSTIEL-WILSON DISEAŠE

(Continued from page 330)

ordinary insulin deficient diabetes. The nature of this defect is yet to be determined.

#### SUMMARY

A case of presumptive Kimmelstiel-Wilson's disease has been presented as a subject of interest because it illustrates transition from an unusually high to a very low insulin requirement in a relatively short period of time.

The cause of insulin resistance is not known in many instances. In certain cases, insulin resisting antibodies have been demonstrated.

The apparent amelioration of diabetes, in terms of insulin requirement, and the relative absence of ketosis in the presence of the Kimmelstiel-Wilson type of renal lesion is described. The basic metabolic defect accounting for this sequence of events is as yet unknown.

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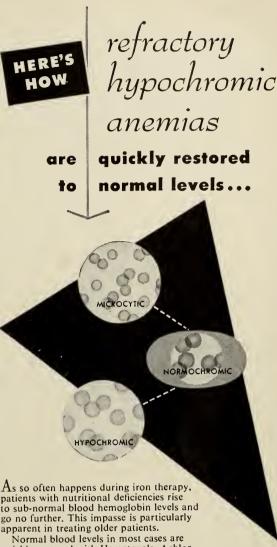
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# Facial Injuries

JEROME A. HILGER, M.D., DOUGLAS R. KUSSKE, M.D., AND BRADLEY W. KUSSKE, M.D.

St. Paul, Minnesota

Nasal fracture is encountered more frequently than any other fracture in the body. It is usually accompanied by fracture or dislocation of the nasal septum. Nasal physiology as well as facial cosmetic considerations demand a satisfactory realignment of the septum and of the external nose. The technic varies with the nature of the fracture.

Local anesthesia obtained by intranasal topical application and procaine injection externally along the fracture lines, when combined with analgesia, usually gives adequate comfort. If it does not, general anesthesia should be used, preferably with an intratracheal tube, rather than risk a mediocre result. Secondary rhinoplastic and septal repair is never as satisfactory as good initial reposition. Disimpaction of the external nasal and septal fragments by forward traction on a rubber tipped forceps or elevator inserted intranasally is usually necessary before fragments can be slipped into place by lateral pressure. The usual fracture maintains itself after it is realigned.

Occasionally a free depressed fragment requires support with a small mass of absorbable gauze in the anterior fornix, or the septum needs support by a finger cot stuffed with gauze. External splinting is useless except as a measure to minimize postoperative edema in more com-

minuted fractures. When comminution is severe and involves the nasal septum, open reduction and realignment of the septum are essential, otherwise intranasal obstruction and external loss of contour results and requires later extensive surgery.

A fracture of the malar bone is often overlooked because the accompanying hematoma obscures the deformity (figure 1). At the end of two weeks, when the hematoma resorbs, facial asymmetry may be very pronounced and loss of support of the orbital contents through depression of the bony floor may result in diplopia. Signs indicative of malar fracture are subconjunctival hemorrhage and anesthesia of the upper lip and lateral nasal wing of the injured side. Posterior-anterior chin-nose position roentgenogram is diagnostic and shows evidence of hemorrhage into the maxillary sinus as well as fracture lines. Late reposition is often difficult because abundant periosteal surface and a good blood supply result in early bone union. Maximum facial and orbital deformity is not reached for many weeks, and chagrin at missing the fracture increases progressively.

A major facial injury usually results in fracture of more than 1 of the 13 bones of the facial skeleton (figures 2 and 3). Soft tissue laceration is frequently present. The facial derangement, however, is not a matter of first importance in a fresh injury. It is vital, first, that the airway be maintained and, second, that the patient's blood volume be restored.

JEROME A. HILGER, a 1936 graduate of the University of Minnesota, is associate professor of otolaryngology at the university. DOUGLAS R. KUSSKE and BRADLEY W. KUSSKE, 1943 and 1944 graduates of the University of Minnesota, are clinical instructors of otolaryngology at the university.

Presented to the North Dakota State Medical Association at Minot, North Dakota on May 11, 1953.



Fig. 1. Appearance of typical malar fracture. As ecchymosis and swelling absorb in the next two weeks, loss of facial contour and orbital floor support becomes apparent. Deformity and even diplopia may then both occur. Subconjunctival hemorrhage, anesthesia of the homolateral upper lip and nasal wing, and an opaque maxillary sinus on transillumination are ample warnings that fracture is present.

A faee-down, head-dependent position minimizes aspiration of blood and secretions. If the mandible is severely shattered, it may be necessary to pull the tongue forward by manual or safety pin traction. Oral suction is helpful. A tracheotomy for ventilation and aspiration (figure 4) should be elected readily rather than denied fearfully — particularly in an unconscious patient who lacks adequate reflexes.

Bleeding from major vessels provides the only justification for immediate attention to the wound. Clamp and tie is then proper but ligatures must be left long enough so that they can be replaced during definitive eare and debridement. A sterile dressing with modest elastic pressure is correct first care in all other instances. Nasal bleeding is no problem if left alone. Edema of the nasal mucosa quickly provides an adequate pressure hemostasis. Adequate whole blood replacement should be provided promptly.

The interval for transfusion affords an excellent period to examine the patient as a whole.





Fig. 2 (left). Gross facial injuries involve bone and soft parts. Repair of lacerations is secondary in importance and timing to skeletal repair. Reconstruction is not an emergency. Patient's general condition and other injuries should be evaluated first. Fig. 3 (right). Skeletal segments to be considered in severe facial injuries.



Fig. 4. Patient three days postoperative in whom tracheotomy proved lifesaving. It also provided access for general anesthesia and postoperative pulmonary drainage.

Extremities, thoracie cage, or pelvic frame may be fractured. A high per cent of jackknifing injuries have compression fracture of vertebrae. Abdominal viscera may be ruptured. A neurologic examination is essential. The middle ears should be viewed relative to basal skull fracture.

The facial derangement should properly wait until the patient's general condition improves. When his condition justifies reparative work, the whole restorative program should be first visualized. The reparative surgical procedures should be grouped. It is embarrassing to find primary bone plating of humerus or femur is indicated when the jaws have already been approximated with intramaxillary wires, and a general anesthetic is no longer possible without deranging everything so far accomplished.

Soft tissue lacerations need not be elosed for forty-eight hours. Approximation with sterile tape and maintenance of modest elastic pressure is adequate emergeney care. An open wound is often distinctly advantageous for direct access for wire or serew fixations. Sometimes an overeager or hurried primary apposition must be taken down to provide access or allow more deliberate apposition under unhurried conditions.

The primary soft tissue repair is not as vital for an exeellent result as is the primary skeletal repair. The facial skeleton does not lend itself well to late adjustment or secondary revision.



Fig. 5. Multiple external fixation appliances. Though not as uncomfortable as first glance suggests, many of these multiple devices can be replaced by simpler fixation by direct drill wires.



Fig. 6. Drill wires can often be used in multiple skeletal fractures to approximate and fix fragments during healing period. The increased comfort and function during convalescence are notable



Fig. 1. Neglected mandibular and maxillary fracture illustrating the severe disability which is the penalty for neglecting occlusion in the reparative period. The most extensive restorative and prosthetic work can give only a partially satisfactory return of function.

Blood supply is excellent and periosteal surfaces plentiful. Bone union is early and firm.

In the primary reparative procedure, reposition of displaced parts should be effected or authority over irreplaceable parts should be established. This authority must be adequate to allow application of traction to the part or of support to a part that does not maintain itself in reposition. Reposition can then be effected at will in the postoperative period. The appliances by which the movement and realignment of fragments can be commanded are legion. The simplest appliance that properly aligns and fixes is the best. Unfortunately some fractures are comminuted and complex. The screws, pins, and wires commanding individual fragments may give the superficial appearance of a Rube Goldberg creation (figure 5). The component parts, however, should always represent the simplest mechanical solution to the problem. The need for external appliances can frequently be eliminated by the use of direct fixation with steel pins and wire loops which lend themselves to a more functional and comfortable healing period (figure 6).

Mandibular or lower third fragments are approximated to the maxilla or middle third. The restoration of occlusion is the primary objective in such cases (figure 7). It is maintained by wiring between the teeth or other device until bone union is complete, so the patient's restored chewing function will be normal.

When fragments of the middle facial third are freely movable, they are supported to a plaster head cap, or are solidly fixed to upper facial structures by the insertion of steel pins (figure 8) for the duration of the healing period.

Traction is used to reposition obstinate displaced fragments. It may be by elastics between maxilla and mandible, or between any fragment and head cap (figure 9). Bed frame, pulley, and hanging weight are needed at times to disimpact fragments or correct delayed malposition.

Middle facial third fragments may take weeks and lower third fragments months to establish self-supporting bone union.

#### SUMMARY

1. Nasal fracture occurs more often than any other fracture in the body. It is frequently accompanied by fracture and displacement of the nasal septum.

2. Realignment of the nasal septum for restoration of nasal physiology is at least as important as reposition of the external nose.

3. Fracture of the malar bone is frequently
(Continued on page 429)



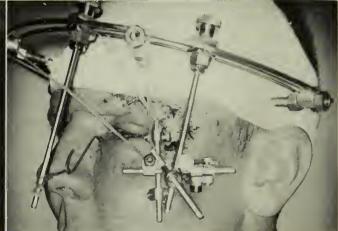


Fig. 8 (left). Transverse maxillary fracture with floating palatal segment brought into approximation manually and fixed with two stainless steel drill wires. Removal after healing period is simple and can be done without anesthesia. Proper approximation of the bite is accomplished before pin insertion. Chewing of soft food is permitted during healing period. Fig. 9 (right). Components of facial skeleton which cannot be manually replaced or will not remain in realignment must be commanded by pins or screws to which traction, in this case with elastics, or fixation bars can be attached.

## A New Stethoscope

# Combination Stethoscope and Percussion Hammer

WILLIAM L. GOULD, M.D. Albany, New York

THE STETHOSCOPE has undergone many improvements since it was first discovered by Laennec in 1816. These modifications range all the way from the bell (Ford) and diaphragm (Bowles) to the intrinsic symballophone of Kerr¹ and the multiple electrical stethoscope of Hoskin,² whereby an entire class of students may listen at one time.

Simple, useful, age-old laws of physics as still applied today, have given us first the science of percussion and then that of auscultation.

Auenbrugger in 1761 applied the principle of tapping the chest for the more solid or rarified parts after watching brick layers and carpenters use this principle in building construction. At this time the only way to listen to the chest was to apply the ear directly to it. Finding this at times not practical, Laennec remembered a well known fact in acoustics. The sound of a pin at one end of a piece of wood was magnified when the ear was placed at the other end. Applying this principle, he rolled a quire of paper into a cylinder and used this to intensify chest sounds. Next came rubber tubing and finally the binaural stethoscope which has changed basically very little throughout the years.

Other stethoscopes include the combined stethoscope, bell and diaphragm. The head stethoscope of Hillis includes a built-in watch and mirror for use in obstetrics and gynecology.

While technical improvements are constantly being made in newer diagnostic instruments, the traditional construction of the stethoscope is usually taken for granted. It has been shown, however, that a few simple changes in the specifications of this instrument increases its efficiency significantly.<sup>3</sup>

Some years ago Rappaport and Sprague<sup>4</sup> demonstrated that the acoustic efficiency of a stethoscope increases as the length of the tubing de-

WILLIAM L. GOULD, a 1920 graduate of Albany Medical College, is medical director of the Jewish Home and Hospital for the Aged, Troy, New York, and on the staff of Albany, Memorial, and St. Peter's hospitals, all in Albany, New York.

creases. More recently<sup>5</sup> the same authors have shown that for cardiac auscultation the efficiency of the stethoscope can be increased by decreasing the bore of the usual commercial rubber tubing.

#### AN 1MPROVED STETHOSCOPE

The stethoscope that I hereby present offers two improvements over those most frequently in use now. First, chest examinations can be performed with a minimum of disrobing. Second, it incorporates a percussion hammer. Despite these changes, the instrument looks like the orthodox diaphragm type.

Many times the busy practitioner is forced to examine the chest over some clothing. Whether the patients are men in heavy, dirty working clothes, or women in flimsy attire, complete disrobing is not always practical. Nevertheless, diagnosis and treatment would be considerably aided if the stethoscope could always be applied to the bare skin.

My stethoscope may be placed directly on the skin without the removal of clothing. This is accomplished by having rigid tubing at the neck of the instrument instead of the usual soft rubber material. This actually affords a workable handle so that the chestpiece may be placed on any desired part of the chest (figure 1). The clothing is simply lifted up so that the chestpiece slides under it. The handle enables the examiner to press the chestpiece firmly against the skin. At times when the chestpiece is in place, it may be desirable to press against the chestpiece directly through the clothing. The chestpiece is unchanged except for the percussion tip attached to its side. Instead of this tip, an enlarged rubber band or other suitable resilient material may completely encircle the head.

In this described fashion, a percussion hammer is incorporated into the stethoscope (figure 2). The chestpiece can be rotated, which enables its open end to face either way. The percussion tip may also be used for tactile sensa-





Fig. 1 (left). Stethoscope inserted from above in front showing how it may be manipulated beneath the clothing. Fig. 2 (right). Percussion hammer of instrument in use.

tion and its pin point may be employed for pain sensation. Thus we have a more complete neurologic device.

Plastic tubing, rather than soft rubber, considerably enhances the appearance of this stethoscope and does not detract from its efficiency in any way.

The possibility of forgetting one of the instru-

ments is eliminated, which is another decided factor in its favor.

#### SUMMARY

A new type of stethoscope is presented. The stethoscope and percussion hammer are combined into one instrument.

Chest examinations can be performed with a minimum of disrobing.

The stethoscope is distributed by Research Supplies, Albany, New York.

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# College Health Comes of Age

DANA L. FARNSWORTH, M.D. Cambridge, Massachusetts

A few weeks ago I had the privilege of listening to an account by one of my medical colleagues and former teachers, who is a physician of great accomplishment, of some of his many experiences teaching and practicing medicine in other countries while on various missions both in war and peacetime. He prefaced his remarks by saying that he had been favored by an intense curiosity, a great capacity for hard work, and a generous amount of luck. In his case I would have called the latter serendipity, the wisdom to take advantage of situations as they arose, but he was too modest for that. He added, "I've always been quite healthy, too."

In a sense, his comments will set the stage for the opening of this Fourth National Conference on Health in Colleges. If we are fortunate, we may not only achieve some of our stated goals, but in addition benefit from serendipity, "the happy faculty, or luck, of finding unforeseen evidence of one's ideas or, with surprise, coming upon new objects or relations which were not being sought." And lastly, but I assure you not least, I hope we will acquire some ideas of how to be healthy and learn how better to inculcate those qualities into college students.

The organization of such a conference as this is not without its hazards, one of them being the risk that differences of opinion as to how a college health program should be organized may make it impossible to derive any coherent scheme. The fact that there are 46 large national groups sponsoring this conference does not mean that there are 46 schemes for improving the health of college students. No, there are far more than that, for there are many differences of opinion in each organization. Yet in spite of all this, the conference has been organized, hundreds of people have helped in the formation of the agenda, and the degree of cooperation has been phenomenal. The guiding principle has been to determine what is right rather than who is right. In the conference, as in the volume which we hope will be derived from its deliberations, there should be room for full presentation of many viewpoints.

The programs of colleges designed to further health standards of students and faculty members

DANA L. FARNSWORTH, a 1933 graduate of Harvard Medical School, was 1953-54 president of the American College Health Association, chairman of the Fourth National Conference on Health in Colleges, and medical director of the Massachusetts Institute of Technology, 1946-54. He was recently appointed Henry K. Oliver Professor of Hygiene and director of all health services at Harvard University.

have suffered all too often in the past from a kind of isolationism. Hygiene courses have been offered in an excellent manner in some institutions, in a desultory, uninspired fashion in others. Frequently they have not been correlated with the health scrvice on the one hand, or other academic courses on the other. The result has been that we as health workers have been somewhat on the defensive, even though convinced that without health we are only a shadow of our real selves and that the pursuit of health is central to our very existence. President Morrill stated a few weeks ago that for an administrator the comfortable and economical way to think about a health program, as about the dean's office. is that "No news is good news." As health programs become more central and better integrated with other departments of the institution, they may be thought of more in terms of their possible constructive role than as devices to tide over emergencies.

However, times are changing and health programs must change with them. Scientific progress has speeded up our way of life just as it has lengthened our years. Cultural progress in the form of self-control and self-understanding has not kept pace. In short, we have been as disproportionate in our development of physical and mental health as we have been in our scientific and cultural progress.

We want not merely physical health, but total health, and to achieve this aim we all must work for it and know how to work for it. My colleague, Dr. Means, has come near to this concept when he stated that health "implies that state in which the organism, human or other, or the community for that matter, has achieved as successful an adjustment to its environment, intellectual and emotional. as well as physical, as its constitution and the equipment available to it will permit. An individual or a community - who has achieved such an adjustment is not only healthy but happy. He who is not happy is at odds with someone or something; he is not, therefore, in perfect adjustment. Often health and happiness result from the successful adjustment to very trying circumstances."2

That no definition of health is ever really conclusive and satisfying to all is borne out by some of the reactions to this definition. One of my colleagues in a nonmedical field said he has a philosophic reservation to this one. "Of course I understand his thought, and for the great mass of society I shall concede that this is not only a good definition of health but also an appropriate objective for society. I cannot, however, accept such a hedonistic philoso-

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phy as a universal good. In fact, I suspect that the factor that preserves us from intellectual and moral stagnation is the constant presence in our society of a certain number of thoroughly maladjusted individuals – people who are downright unhappy because they fail constantly to satisfy their intellectual

and spiritual cravings.'

Professor Highet of Columbia University has said that the physician may cure a patient by chemical or surgical intervention, but he can keep him well only by teaching. The college health worker is primarily a teacher, whether he teaches classes or not, or whether he be a health educator, a coach, a nurse, a physician, or some other kind of professional in this broad field. If, as the author of a recent book in this field has successfully contended, Public Health Is People,3 the same can be said of college health. Hence, in this conference, all the people are represented, from students to presidents. The professional, working alone, suffers from one of the undesirable effects of isolationism, namely, cultural starvation. Consulting together in this fashion will undoubtedly enrich our thinking for years to come; in similar day-to-day activities on our individual campuses, the continual exchange of ideas between health workers and all other teachers and students keeps us growing at a maximal rate.

If the health problem is considered from the physician's standpoint, one can recognize a state, perhaps at its zenith in the William Osler period, when accurate diagnosis and treatment were the most emphasized aspects of medicine. Overlapping this period to some extent, is that in which an increasingly great emphasis was directed toward the prevention of disease. This was an enormous advance from every conceivable point of view, resulting in much greater control of communicable diseases, decreased incidence of tuberculosis, rheumatic fever, and syphilis, and the practical disappearance of some diseases such as smallpox and typhoid fever. The good effects of such programs of preventive medicine were the results of a combination of many factors - better sanitation, better diets, improved health habits, higher housing standards, greater use of immunization procedures, isolation of persons harboring infection, and better general medical service. A new special field, that of public health, was developed and came of age.

In this conference we will celebrate the emergence of a still newer kind of emphasis, that on building health. It is not new in the absolute sense; many of you have given your entire professional lives to just this idea. What is new is that the idea is catching on in an accelerated way. The concepts of diagnosis and treatment, and that of disease prevention are no less important and no less necessary — in fact, progress in those areas must always be vigorously maintained. What remains to be done is to work out methods by which the various advances made by specialists in those fields can be brought into the lives and thinking of all our citizens to a degree sufficient to build stable health. No group of health educators or medical specialists

can do this working alone. The active cooperation of the consumer, and those who represent the consumer, is vitally necessary.

At the time of the third conference in this series, seven years ago, we were just getting reorganized and stabilized after the disruptions of World War II. Under the able leadership of Dr. Ralph Canuteson, of the University of Kansas, now quite active as chairman of one of the committees of this conference, the best thinking in the field of college health was brought together in a volume which has served as a guide for the intervening years. During this period, many health programs have grown rapidly. There has been a further gradual awakening of interest in the field of student health on the part of young physicians and health educators. The concept of integrating the efforts of all those who wish to improve health-building attitudes and conditions has grown quite rapidly. This has been accompanied by some degree of anxiety by those who feel that too much blending of efforts will tend to lower standards of specialized groups, thus harming student health in the long run. A part of our task is to make our efforts meaningful and effective, without weakening or diluting the work of any single group. The success of previous combined group meetings, with free exchange of ideas on how to develop a college environment that will promote health, has been notable. These conferences have helped to make efforts in this field rewarding, stimulating, and even exciting.

I note that young physicians, who see how medicine can work in harmony with other college and university groups, get vitally interested. Likewise, I have seen many college deans and faculty members show great enthusiasm for the help derived from a broadly based health program. Such integrative efforts directed toward the common goal of developing responsible, mature, and enthusiastic young men and women are vitally needed not only to combat current attitudes of frustration, conformity, hostility, suspicion, and general apathy, but to develop positive, healthy attitudes toward all human beings. As one group of young people recently phrased it, "We need to learn how to talk with one

another without getting mad."

Our problems in this endeavor are many and varied. Some of the difficulties stem from the fact that there are about 1,885 institutions of college grade in this country, a large proportion of them with enrollments under 500. Maintaining an adequate health program in the small college calls for quite different planning from that in developing a similar program in the large institution. In all of these schools, the question of how a health program is to be supported financially looms the largest, at least in the administrator's mind.

The great majority of our colleges are beset by financial problems in all their other fields of activity also. Many believe that if a program of medical care is developed in the college, it should be selfsupporting. If this principle is generally accepted, the work of our committee on insurance and other prepayment plans is of enormous importance, in that it may be able to show the rest of us how especially adapted plans for our own colleges may be worked out.

In this connection, one other very important principle should be stated, at least for discussion purposes, namely, that the students and faculty members should be responsible individually for the costs of medical care, but that the costs of the educational program and the research accompanying it, or which should accompany it, be borne by the institution just as every other department is supported.

Under this principle, to cite one example, the costs of sanitary inspection would be borne by the dining facilities and thus be reflected in the charges for food. In this way, every college really wanting a good health program can develop and support one in an adequate manner without depriving the already established academic departments of the funds they must have for effective maintenance.

The college group is in general as healthy as any other part of our population, and at the same time is under heavy financial strain. A part of our social duty to this group is to see that the best possible medical care and health-building programs are available at the real cost of the service. This cost is not as high as the general average for the whole population and, in my opinion, health insurance rates for students should reflect the difference.

In a teaching center in which hospitals and medical schools combine to make possible the best opportunity for medical training, it is axiomatic that the important activities are the care of the patient, research, and teaching. When one suffers, the other two deteriorate. This is precisely true of college health programs. It is almost universally assumed that sick students or staff members should be helped in obtaining the best possible medical service, either at the college health center or in the community. It is becoming increasingly clear, as implied previously, that only by teaching is the health of an individual or the community to be built up to its maximum level.

However, the idea that research is an integral part of the function of a college health program is not so well accepted. Research, in essence, means the combination of a curious mind and opportunity for interpreting special kinds of experience. All too often research is thought of in terms suitable to large institutions, namely, that of cooperative ventures preceded by large scale planning, carried out by teams of workers from various disciplines and coordinated by a central staff. Obviously this kind of research is impossible in all but a few centers, but the kind of research which consists of interaction of the curious mind with new experience is still not outmoded and helps keep the individual worker alert, informed, and motivated.

Our great opportunity at this time lies in the application of knowledge already derived by others. Yet, in the process of determining how that can be done, real research needs to be done urgently. This type of research requires the active cooperation of

many colleagues, both in the sciences related to medicine and in education.

By cooperative research ventures we may learn something of the natural history of hypertension, of better safety programs to reduce athletic, laboratory, and recreation accidents, and effective ways to deal safely with large sources of radioactivity.

Among the most important questions calling for an answer in the psychologic field are those concerning motivation. What are the emotional blocks to learning? Why do some students make honor grades while others, equally intelligent, fail? How can knowledge derived from emotionally disturbed students be organized and transmitted to teachers and students in such a way as to facilitate the learning process?

Are good health habits most likely to be developed on a campus or in a community by formal or informal teaching methods? How can that minimal degree of alertness or awareness in the individual be developed in such a way that he will use health facilities in an optimum manner, without being hypochondriacal or medically careless? If the faculty is included in the health program, does that facilitate the improvement of teaching proper health attitudes and habits to students?

In most educational schemes the student is actively engaged in carrying out aims and plans developed by someone else. He rarely has the privilege of sharing in the determination of plans he would like to perform in any sense other than choosing from several set possibilities. Perhaps healthbuilding is one of the fields in which the active participation of the student at the planning level might be one of the strongest motivating forces toward achieving the aims desired. In Finland, the student health services were set up and are administered and maintained by the students themselves through the National Union of Students of Finland. The program includes every phase of health work, including health education. Since Finnish colleges and universities do not maintain dormitories or dining halls, the health problems they face are more or less comparable to those of our larger public urban colleges. Incidentally, the biggest single health problem faced by their health services is the control of tuberculosis, the number of active cases found per 1,000 students having been 12 in 1946, 3 in 1949, 7 in 1950, and 3 in 1951. Something of great value may be inherent in the Finnish students' approach to this problem.

A basic problem from the educational point of view in those institutions that do not give compulsory hygiene courses is that of reaching the student who does not have any illness while in college. Aside from an entering physical examination, an annual tuberculosis survey, and supervision during athletic participation, he may never be aware of his college's health program. As one dean of women said recently, "Our students are oriented to disease but not to health. They know what to do when they get sick, but from their actions they seem to know very little about what to do to remain healthy."

Overcoming this discrepancy will be difficult, but it is one of our prime objectives. The committee on "Educational Potentialities of the College Health Program" has been working on this problem, and we look forward with great interest to learn of the sug-

gestions which its members will develop.

The Bible suggests that no man, by giving thought, ean add one cubit to his stature. He can, however, achieve at least as worthy an end by giving thought to adding to his length of days. Safety programs may be narrowly conceived, or they may be integrated into broad health programs in subtle ways that affect the quality of living both in the individual and in a collective sense. Safety may be driving with caution or it may be the habit of thinking practiced by an individual in which he always acts in a thoughtful manner without undue impulsiveness. Both the narrow and the broad points of view are necessary, depending upon the circumstances and the goals desired. The committee on environment will have enormously important matters in this field for consideration. Students, like other people, tend to adopt those practices which they see about them every day. Hence the sanitary inspection of food preparation and distribution facilities, adequate illumination in class and living rooms, attention to neighborhood surroundings by school authorities, attention to occupational hazards in the laboratory, and many other signs of interest in the environment all form subtle but powerful teaching forces.

Only within the past two or three decades has the concept of psychiatry as an aid to education become common. Prior to that time, the psychiatrist was thought to be useful in an educational institution only when a student or faculty member became so ill that he had to be cared for in a mental hospital. Each time a psychiatrist was called into consultation in a college and began to notice the conditions around him, impetus was given to the idea that caring for a sick student was not a particularly fruitful way of handling the problem of mental health on a college campus, however necessary it might be to solve the acute emergency. Gradually the idea has arisen that mental health really consists of the way people get along with one another on a college campus or in the community. Instead of being thought of as the mere absence of disease, it has gradually come to be considered a way of life which is as free as possible from unnecessary conflicts either in the environment or within the personality. It has come to be intimately tied up with morale on the campus, student government, teaching and learning, and attitudes of faculty members toward one another and toward students. It is closely related to subsidization of athletics, methods of developing discipline, student counseling programs, the architecture of the dormitories, and the way notices are issued by the administration or other groups to the rest of the college.

As these concepts of mental health have developed still further, the training of feeling has come to be considered very seriously. Added respect for

sentiments and emotions has given rise to a questioning attitude of whether the concept that the intellect is all that a college should be interested in is adequate. Such consideration led quite naturally to speculation as to how maturation, both emotional and intellectual, can best be achieved in the college student.

Dr. Alan Gregg has commented that since the subject matter which forms a legitimate focus for interest of faculty members is so variable and since the students are even more variable, perhaps attention focused at least as much upon the student as upon the subject matter would be wise. He says that the crowning glory of the human race is that immaturity lasts a long time. Instead of saying that a student of 22 is brilliant, he suggests that we say that he is brilliant for a 22 year old. A more slowly maturing student may far outstrip him in later years.

This interest of the physician and other workers in mental health is matched in a college which really wants to develop a program in this field by similar interests of all the other groups on the campus. Although this point of view is not shared by all workers in this field, I am firmly convinced that mental health is everybody's business and that mental health is necessary in order to enable the college to carry on its chief function, namely, the dissemination of

learning and addition of new knowledge.

Unfortunately that is no longer enough even though it is the central aim. Dr. Lawrence Kubie has recently been developing the thesis that without self-knowledge "in depth," the master of any field will be a child in human wisdom. The old adage of Socrates that man must know himself requires a new and very difficult application. Kubie believes that education for wisdom must close the gap between erudition and the irrational influences that play such a strong force in any person's life, by "providing insight which penetrates into those areas of human life in which unconscious forces have hitherto played the preponderant role." Self-knowledge is not the end desired but rather that quality which makes maturity and wisdom possible. The continuous, close collaboration of the physician, the psychiatrist, the counselor, and the teacher may make it possible to develop technics for progressing toward the ideal of knowledge of self. In no field is research so much needed. The health worker is in a central point from which to observe and to act.

From the standpoint of a college administrator, the problem of supplementing the student's classroom experiences by suitable personal contacts between student and faculty member is urgent. Learning goes on all the time, and more attention is needed in that area between the classroom and the traditional extracurricular activity. As the process of education has become more complicated, due to the rapid accumulation of knowledge and the change from a rural to an industrial urban society, the student is called upon to make more and more complex choices as he advances. His contacts with an older and more experienced mind in action may be thought of as counseling, for lack of a better term.

From this viewpoint every teacher is a counsclor, but no teacher can possibly be expected to contend adequately with all the delicate, subtle, and sometimes utterly illogical situations that confront him in his relationship with his students. Hence, professional help may be placed at his disposal when circumstances permit. This help may be that of the psychologist, the vocational guidance expert, the study counselor, the reading disability expert, the psychiatrist, the social worker, the dean, the chaplain, the director of scholarships or student aid, or the physician. At the same time the student is receiving aid from one of these professionals, his relationship with the teacher-counselor continues.

How can all these activities be coordinated in such a way that the college president may have some idea of what is going on, that activities are not duplicated, that competitive groups are not formed, and that the student may have the best possible opportunity of doing effective work? The health worker has a major interest in this field, for it is through counseling situations that much of the best teaching and learning is accomplished both in healthbuilding, preventing disease, and promoting maturity. Yet none of us must ever lose sight of the fact that the central business of the college is the acquisition, dissemination, and advancement of knowledge. A sign of our own maturity or the lack of it will be the degree of success with which we learn to work together and coordinate our efforts and our different points of view.

The importance of the counseling activities of coaches, physical educators, nurses, and others is sometimes overlooked. These professional workers in special areas may find that their close contact with students enables them to develop and encourage favorable attitudes and to detect serious problems earlier than their classroom colleagues.

A great deal of teaching can be done by staff members of a health program in indirect ways. A student who lives on a campus of a college where health practices are of a high order can scarcely fail te develop certain attitudes which will be reflected in insistence on high health standards in the community in which he lives later on.

Reading a book on the health practices and standards in the Revolutionary War or the Civil War brings home to anyone the tremendous effect that improvement in health standards has had on the development of our present urban, largely industrial society. These health improvements have freed men for constructive endeavor and at the same time improvements in living conditions have resulted in further benefits to the human being so that he lives longer. Thus a beneficent cycle arises in which health, industry, and education all become completely interdependent. Again, the fact that our

physical health is improving at a more rapid rate than our mental health, calls for concerted effort to improve the latter. Members of the medical profession and their colleagues in allied fields too long have taken the narrow view that health is the absence of disease. Medicine owes many of its great advances of the past half century to specialists. It has the opportunity of making a major contribution in the next half century through a kind of medical statesmanship, combining the narrow with the broad view. It cannot do this alone, however, but must consider the average citizen, the consumer, the educator, and everyone who has a stake in improving the quality of living.

In one very important way we begin this conference with an advantage none of our predecessors have had, at least not to the same degree. I refer to the survey of health facilities in American colleges which has just been completed, thanks to the more than heroic efforts of Dr. Moore and Professor Summerskill and their associates of Cornell University. This volume of more than 100 pages contains more statistical information about health programs than has ever been gathered together before and, unless another very inspired group appears, more than is apt to be collected again for several years. Some of the findings are rather surprising, such as that relating to the extent to which care is being provided for faculty and staff members, or that 30 per cent of the colleges surveyed allow access to their medical records by anyone interested. The low average for health service expenditures and the low salaries for staff members are not surprising. About 200 colleges in the group with whom definite contact was made assume no responsibility for any health matters. Forty-six institutions have budgets of more than \$100,000. Conformity is not one of the problems in this field. Every committee will find this survey to be of inestimable value, and our thanks go to all who made it possible.

And now we must get ahead with the work of the conference. I have merely given a brief outline of some of the issues that need consideration. As James Thurber's city dog learned when he went to the country, it is better to know some of the questions than to know all the answers. We will try to cover the main questions and hope for a few answers. Those committees whose work I have not mentioned also have serious questions to consider, some of them of more importance and urgency than those I have discussed. Although the committees will be meeting concurrently, and each has a separate agenda, there will and should be overlapping of interests and subject matter. The success of the entire conference will be in a sense a test of our capacity to listen, to weigh issues, to express our opinions clearly, and to harmonize competing and conflicting demands.

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## A Conference on Bullous Dermatoses\*

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THE BULLOUS DERMATOSES, including dermatitis herpetiformis and pemphigus, have been the subject of debate by dermatologists since the earliest days of the specialty. Clear diagnostic distinctions between the various members of this disease group could not be outlined and only recently have microscopic changes been considered confirmatory. Largely due to the investigations of Civatte, Dupont, Tzanck, and their pupils, the diagnosis of pemphigus vulgaris and its modifications can at the present time be greatly assisted by microscopic examinations.

The problem of pemphigus rests largely with dermatologists, for other branches of medical science are not as yet interested.

Only at the first international congress held in Paris in 1889, were bullous dermatoses allotted the distinction of a main theme and then largely because of Duhring's review of the subject. At that time it was recorded that Brocq, Kaposi, Unna, J. Neumann, and others discussed the propriety of considering Duhring's disease as a form of true pemphigus. Even at the congress held in London in 1952, only three minor papers on pemphigus were submitted, one on a fatal case of dermatitis herpetiformis, one on the possible viral etiology of these diseases, and a third on steroid therapy.

In the first edition of Hebra's text, no chapter was devoted to pemphigus, but when Kaposi became a coauthor of subsequent editions, the subject was well covered. In fact Kaposi reviewed his experiences in treating some 2,000 cases which he had reported before an early meeting of the German Dermatological Society. Kaposi did not concern himself with histology, although mention of Auspitz's investigations was made. In the 1876 edition of Neumann's dermatologic text, pemphigus vegetans was well described and a discussion of histology was included. Cazenave is accredited with introducing the term "foliaceous." Leloir in 1882 wrote an extensive article on pemphigus. Ehrmann, in his text on histopathology in 1906, described the microscopy of pemphigus, but, although he mentioned some changes in the epidermal cells, he did not stress their significance. Darier in 1913 mentioned acantholytic cells and may have furnished that concept for Civatte's later consideration.

Jesionek in 1916 was the first to write on the histobiologic aspects of pemphigus and emphasized the importance of the epidermis itself in the disease

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process. He considered pemphigus as a disease whose noxae made their first onslaught on epidermal structures and interfered with their normal cohesion. Kyrle was influenced by Jesionek's teachings and in 1919 repeated how important the epidermal pathology was in the disease. Pollitzer, in his translation of Darier's text, mentioned acantholysis and evidently was impressed by that finding in pemphigus. In Unna's memorable book on dermatologic histology, pemphigus has a prominent chapter. Gans' text covers the subject, but the position of the bullae rather than the epidermal changes are stressed

Although many histologists undoubtedly were aware of epidermal changes, the studies of Civatte, Dupont, Tzanck, and their pupils brought the diagnostic value of the epidermal pathologic changes in pemphigus to its present important position in differentiating bullous eruptions. Moreover, their work has given a certainty to the diagnosis and permitted the classification of a large proportion of patients in whom the clinical diagnosis is pemphigus. In fact, where heretofore many dermatologists largely depended on a clinical diagnosis in this group, henceforth a microscopic diagnosis should supersede the macroscopic. Civatte and Dupont stressed the position of the bullae, the line of cleavage, and the changes in the epidermal cells. Tzanck's studies of direct smears from the base of the ruptured bulla offered, in addition, minute cytologic descriptions for identifying the acantholytic epidermal cell, or so-called Tzanck cell.

A microscopic diagnosis is paramount in dealing with this group of diseases, and it is most important that the work of Civatte, Dupont, and others be presented to American dermatologists for their consideration and, I believe, acceptance.

Steroid therapy has greatly altered the prognosis in pemphigus vulgaris, and is at present considered the treatment of choice by those who see fairly large numbers of cases.

Dr. Stephen Rothman discussed the physiology of blister formation and a summary of his paper follows:

In order to understand the manifold mechanisms of blister formation, study must be made of the nature of adherence of cell layers and cells to each other in normal skin and the forces which are able to break this adherence at different sites.

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This conference report does not include all the papers presented. The investigations of Drs. Beerman, Brennan, Lever, Montgomery, and others have been included in articles published elsewhere.

Considerable adherence is created mechanically at the epidermal-dermal junction by the claborate systems of interdigitations between papillae and interpapillary ridges and between the slender root feet of basal cells and the connective tissue mass. This mechanical adherence can be overcome by mechanical forces, that is, by energetic suction or forceful stretching.

Separation of the epidermis from the corium by peptic and tryptic enzymes, by acids, by neutral salts, and by heat is based on differential swelling of the two layers. Because of greater swelling of the corium, a displacement of the papillae occurs.

Iodide and thiocyanate are the most effective anions in causing connective tissue swelling and early separation. The assumption in dermatitis herpetiformis is that the junction is pushed toward a loosened state through a swelling process, and an additional push in the same direction by iodides or thiocyanates will bring about complete separation. It must be noted that thiocyanates have the same or greater blister-provoking effects than iodides.

The adherence of the basal layer to the rete must have a specific nature. If excised skin is immersed in half-saturated lime water, the rete is washed off, the epidermal-dermal junction remains intact, and the well-preserved basal cells stick to the corium.

Intraepidermal vesiculation scarcely can be explained by hydrodynamic pressure of exuded plasma. There always is primary epidermal damage. The skin contains proteolytic enzymes which are liberated after epidermal injury and cause disintegration of epidermal cells. Furthermore, the split products of the proteolytic process cause acute inflammatory reaction. Recently, Wells showed that the main site of Peters' "dermoprotease" is in the epidermis.

Evidence is accumulating to show that there are proteolytic enzymes which primarily and selectively attack the spines before they attack the cytoplasm. Stoughton has isolated an enzyme from the stools of patients with ulcerative colitis which does exactly that. This enzyme is inhibited by sulfated compounds such as suramin sodium which was found to be beneficial in the symptomatic treatment of pemphigus. The presence of a similar enzyme in pemphigus may be assumed, and probably is liberated from epidermal cells by the unknown causative agent.

The present status of experimental research on intraepidermal blister formation suggests that (1) exogenous and endogenous epidermal injuries lead to the liberation of proteolytic enzymes which cause disintegration by chemical decomposition of cellular proteins and in this way cause blister formation; (2) the split products of enzymatic proteolysis cause acute inflammatory reaction; (3) the pressure of exuded fluid has a minor, if any, role in blister formation; and (4) enzymes are present which selectively attack the intercellular bridges.

As further comment, it may be said that pemphigus is an urban disease, not because it occurs preeminently in cities but because patients gravitate to cities where they may receive attention from specialists and also because the small hospitals do not have facilities to care for such a difficult problem. Then, too, most patients with protracted pemphigus do not have the financial means for prolonged care and must become public charges.

This fact was well illustrated in old Vienna where the water-bath treatment established a center to which pemphigus patients came from the surrounding states. Viennese dermatologists accordingly became authorities on this disease. Therefore, it is fitting to quote from the opinions of Professor Artz of Vienna, whose views are similar to those gen-

erally accepted in this country.

"Under the term 'pemphigus' are summarized different dermatoses, their main symptom being blister formation. Under the term 'pemphigus vulgaris,' in the restricted sense is meant a group of diseases accompanied by blisters but whose etiology and pathogenesis are absolutely enigmatic. All known bullous dermatoses with a known etiology — there are many of them — have to be excluded at the beginning. To the pemphigus group in the restricted sense belong: (1) dermatitis herpetiformis (Duhring), and (2) pemphigus vulgaris chronicus, with its special forms: (a) pemphigus vegetans, and (b) pemphigus foliaceous.

"Not belonging to this group are: (1) pemphiguslike eruptions of erythema multiforme, (2) bullous porphyrin dermatoses, and (3) bullous drug exan-

thems, and so forth.

"According to our present knowledge, the following are possibilities for a classification: (1) clinical and morphologic picture and development, (2) histologic changes, and (3) cytologic tests (Tzanck and others).

"As neither the histologic picture nor the cytologic tests yield absolutely safe results for a routine examination — their scientific importance is acknowledged fully — the Vienna school still considers a thorough clinical examination and observation of the course to be necessary for the diagnosis.

"We distinguish the following clinical forms but consider them as belonging together: (1) pemphigus acutus or pemphigus malignus, (2) pemphigus vulgaris chronicus, (3) pemphigus foliaceous, (4) pemphigus vegetans, and (5) dermatitis herpetifor-

mis (Duhring).

"Pemphigus acutus. This is a rare disease with a very violent course which is reminiscent of sepsis. The start is sudden with general symptoms. Urticarial foci with central blisters appear in the skin; new blisters appear over and over again along with erosions which bleed easily on the mucous membranes and are often preceded by an eruption of bullae. Tracheitis, bronchitis, and enteritis indicate that other mucosae are involved. In most cases, this disease leads to early death. It is doubtful whether acute pemphigus is a genuine pemphigus. It is more probable that there is an infection, though often a cryptogenetic one.

"Pemphigus vulgaris chronicus. In these cases too, erythemas and wheals sometimes are found at

the beginning. Blisters the size of chicken eggs or smaller appear on a normal or slightly reddened skin which can be increased by pressure. The blisters on the mucous membrane of the mouth appear primarily as painful erosions. It should be emphasized that an isolated pemphigus of the mucosa of the mouth exists where the outer skin shows no blisters at all. All of the other mucosae may be attacked by the disease. From the apparently normal skin, the epidermis can be loosened by pressure or by stroking. Usually itching does not occur with pemphigus vulgaris. The course of the disease is highly variable. Remissions of different duration occur. Every case of genuine pemphigus leads to death either through an intercurrent disease or through the basic disease. Histologic examination reveals acantholysis in different strata of the epidermis.

"Pemphigus foliaceous. This variety is much rarer than the others; the main quality is the looseness of the bullae. There is no epithelization but scaly crusts develop at the periphery while the blisters progress. The mucous membranes are affected too. Effluvium is frequent. A transition of pemphigus vulgaris into a pemphigus foliaceous has been observed often,

but not the converse.

"Pemphigus vegetans. This is another variety of pemphigus vulgaris and is characterized by the luxuriant growth of the base of the blisters while the disease progresses with the appearance of new blisters at the margin. The Nikolsky phenomenon is positive to a changing degree. The course is as a rule chronic, often lasting many years. The places of contact are the places of predilection; mucous membranes may be affected too.

"Pemphigus herpetiformis (Duhring). In contrast to pemphigus vulgaris, this disease is highly polymorphic and, as the most important finding, herpetiformly arranged. Subjective symptoms, especially intense itching, are present. Thrush-like urticarial eruptions are characteristic. They are arranged in groups with the development of blisters and later of pustules and crusts also in focal arrangement. The mucous membranes are, according to the experience of the Vienna school, always free in this disease. The course is chronic with remissions and with long free intervals. It is significant that, as a rule, we find hypersensitivity to the percutaneous and peroral use of iodine preparations in Duhring's dermatosis. The transition of dermatosis herpetiformis into a pemphigus vulgaris has been observed repeatedly, but never the opposite phenomenon. The prognosis is decidedly more favorable than in pemphigus vul-

"Symptoms distinguishing Duhring's dermatosis from pemphigus vulgaris are: an irregular course with thrush, polymorphism, herpetiform arrangement, intense pruritus, unaffected mucous membranes, and absence of Nikolsky's phenomenon. Other findings such as eosinophilia and hypersensibility to halogens may be also used for the differen-

tial diagnosis.

"Though in most cases a diagnosis can be made by a precise clinical examination, nevertheless the fact must be emphasized that no absolutely pathognomonie sign is known which will distinguish Duhring's dermatosis from pemphigus vulgaris. There are some cases which cannot be classified at the beginning.

'As we are totally ignorant about the etiology and pathogenesis of these diseases, we must still rely on the clinical picture and the course if we are to make

a differential diagnosis.'

The Scandinavian schools of dermatology often have been influenced by either the German-Austrian or French authorities on the subject, depending upon the training of the individual in charge of a particular clinic. Professor Hellerstrom of Stockholm submitted the following summary of his views:

"At the Dermatologic Clinic in Stockholm, from a practical clinical point of view, we separate dermatitis herpetiformis and pemphigus into its various forms: pemphigus vulgaris, pemphigus foliaceous, and pemphigus vegetans. Sometimes such a differentiation is difficult or impossible to make, and in such cases the course of the disease is the deciding factor. In pemphigus the phenomenon of Nikolsky is present, but in some cases of dermatitis herpetiformis a positive Nikolsky is found. A positive test for iodide is in our opinion decisive for the diagnosis of dermatitis herpetiformis. A negative test does not absolutely speak against this diagnosis. In the latter case the test has to be repeated, for on different occasions it may vary between negative and positive.

"A histologic differentiation between pemphigus vulgaris and dermatitis herpetiformis is, from a clinical point of view, not always possible. In both cases the blister may be situated sub- and intradermal; in both diseases eosinophilia may be found which, however, is more common in dermatitis herpetiformis. In pemphigus vulgaris the infiltration is in general diffuse in edematous tissue, but in dermatitis herpetiformis the infiltration often is localized around

the vessels."

Although both Drs. Artz and Hellerstrom still are convinced that the iodide test is valuable in diagnosing dermatitis herpetiformis, I believe that most American authorities do not place much reliance on

the procedure.

For fifteen years, numerous studies have been carried out in France on pemphigus. They began during the time of Darier, then were followed up by his students, A. Civatte and A. Dupont. These authors have brought out in many publications their doctrine, based on both clinical and histologic findings, which gain acceptance each year in larger and larger circles. Thus they continue and carry out the classification begun by Duhring and by Brocq.

The separation made by these authors of "dermatitis herpetiformis" or "painful polymorphous dermatitis" on clinical grounds alone, they find today

fully justified by the pathologic anatomy.

The French view is that the bulla of the dermatitis of Duhring-Brocq is a subepidermal bulla formed by the detachment of the epidermis intact with no other alterations, at least at first. This latter character distinguishes it from the bullae of polymorphous erythema and of the erythemas of intolerance.

The bulla of pemphigus is entirely different under the microscope, and cannot be considered similar to the dermatitis of Duhring. This is a bulla which is introduced into the epidermis and, at the expense of the latter, by a dissociation activity due to acantholysis. The cells thus liberated often present nuclear changes in the form of more or less monstrous nuclei.

All the diseases to be included in the pemphigus group present these essential lesions. There remain then pemphigus vulgaris subacute or chronic, which always has characteristic bullae; pemphigus vegetans and pemphigus foliaceous, which have them only at certain phases of their evolution, notably at the beginning.

The presence of this bulla by acantholysis characterizes pemphigus and permits the diagnosis to be made with certainty. As with malignant tumors, the histologic picture not only permits making the diagnosis but also predicting the evolution, which will be especially rapid toward death as the changes of

the acantholytic cells are prominent.

The diagnosis of pemphigus, supported thus by histology, presents only one difficulty, which is nevertheless not insurmountable. Hailey's disease also shows an intramalpighian bullae by acantholysis. But the outlines are sufficiently different from those of true pemphigus bullae, and the nuclei of the acantholytic cells are not altered.

Civatte and Dupont are emphatic in their conviction that a positive differential diagnosis of pemphigus can be made by histologic examination. Their decision is based on a great deal of experience and, I believe, should be accepted in a positive sense, for Civatte's ability and reputation as a histopathologist commands the utmost respect.

Tzanck, who has had much experience in hematology, became interested in the immediate cytodiagnosis of cutaneous lesions, especially bullous diseases, and evolved the so-called Tzanck test which depends upon identification of the altered malpighian cell, called the Tzanck cell, in direct smears

taken from the exposed base of bulla.

The following is a resumé of his method and views.

Examination of fragments of skin lesions stained directly on slides as in blood smears, can give results of great theoretic and practical interest. This method of investigation, unlike a biopsy, gives little information about the structure of diseased tissues, but instead, precise cytologic details. Because of its simplicity, rapidity, and ease of interpretation, immediate cytodiagnosis in some cases can satisfactorily complete the dermatologic investigation. Not only can it give an exact diagnosis, but it can increase our knowledge of a number of dermatoses.

The method varies with the type of lesion, but it is always essential to try to obtain the pathologic cells themselves, and not crusts, scales, blood, and so forth. Thus, for examination of bullae, it is better to scrape the floor of the lesion than to take the bullous fluid which alone is often examined. Oozing from lesions should also be avoided by keeping away from the skin surrounding the lesion. We use the May-Grunwald-Giemsa stain which is familiar to hematologists.

Interpretation of these slides requires practice, but soon abnormal cells can be distinguished from those present in normal skin. In the latter, isolated cells are seldom found, and the plaques of normal cells detached by the curet are easily identified.

#### BULLOUS DERMATOSES

In these conditions, immediate cytodiagnosis is of greatest value in making the sometimes delicate distinction between chronic pemphigus and dermatitis herpetiformis. All the signs on which this diagnosis is made can be absent. Neither pruritus, eosinophilia, potassium iodide sensitivity, preservation of general health, nor the appearance of lesions in crops have definite value. Nikolsky's sign is often absent in pemphigus, but the structure of the bullae is very different in the two conditions. In Duhring's disease the bullae lie either deep in the epidermis or below the stratum corneum. Pemphigus, on the other hand, is essentially an alteration of the cells in the substance of the malpighian laver. The cells lose their prickles and become separated from each other and this acantholysis produces a cavity which is not subepidermal, but intraepidermal. Immediate cytodiagnosis easily shows this. In all cases of pemphigus that we have examined, scrapings from the floor of bullae or mucous membrane erosions have shown malpighian cells easily recognizable by their large pale nuclei, abundant basophilic cytoplasm, a tendency to become keratinized, but rounded, separated from each other even when in plaques - showing the essential lesion of pemphigus to be a disintegration of the malpighian layer by acantholysis.

In Duhring's disease we have found nothing like this. The cells here are from the blood and especially eosinophils, the presence of which is stressed by most authors. The only difficulty may be caused by plaques of normal epidermal cells detached by scraping – but the normal appearance of the prickle cells should be seen without any tendency to acan-

Immediate cytodiagnosis not only clears a number of diagnostic difficulties but helps clarify the problem of subacute pemphigus. Recently we studied such a case, beginning as usual with mucous membrane lesions and ending in death in a few months. Examination showed not only acantholytic malpighian cells as in pemphigus vulgaris but also giant cells which at first glance made us think of a malignant tumor.

There we found an explanation of the classification of subacute pemphigus and we were able to separate it from infectious diseases and put it into the group of dystrophies, which can be found in all degrees of severity from subacute pemphigus through pemphigus vulgaris to the Senear-Usher syndrome.

In summary, bullous diseases can be divided into

three groups:

1. Bullae due to a known cause: (traumatic, toxic,

syphilitic, butcher's pemphigus).

2. Bullae due to intolerance or allergy: (bullous dermatitis artefacts, bullous eczema, hydroa, dermatitis herpetiformis).

3. Dystrophic bullae: epidermolysis bullosa (bullae in nervous diseases, pemphigus vulgaris, Senear-

Usher syndrome, subacute pemphigus).

No doubt direct smears in many dermatoses, especially those in which a particular identifying cell may be present, such as Hodgkin's disease or the leukemias, may be of great value. This method now applied to bullous eruptions offers an additional and undoubtedly a fruitful method for diagnosis and investigation.

Dr. Tzanck's views of diagnosis in the pemphigus

group are summarized as follows:

Applied to the diagnosis of bullous dermatoses, cytodiagnosis has shown itself to be very fruitful as much by the information that it furnishes as by the possibilities of research which it offers.

#### DIAGNOSIS OF BULLOUS DERMATOSES

It is well-known what difficulties may arise, without recourse to biopsy, in deciding between a pemphigus and Duhring-Brocq's malady. As Darier has emphasized, one hesitates when faced with the initial lesions of chronic pemphigus which have the appearance of a stomatitis, an angina, a hydroa, or a toxiderma. But this hesitation is prolonged in cases

of Duhring-Brocq's malady.

Brocq has described at great length the signs of differentiation and the following speak in favor of Duhring-Brocq disease: eruptive polymorphism, constant pruritus, the chronic evolution through recurrent outbreaks separated by more or less calm periods, eosinophilia of the liquid of the blisters and of the blood to an important ratio. Let us add the absence of the loosening of the epidermis (Nikolsky's sign), and finally the special sensitivity of the dermatitis to iodine. It remains nonetheless true that all the signs on which the diagnosis between pemphigus and Duhring-Brocq's malady is made may be wrong.

On the one hand, neither pruritus, eosinophilia, sensitivity to potassium iodide, the preservation of the general state, or evolution in waves or attacks have any absolute differential value and are variable. On the other hand, Nikolsky's sign sometimes exists in the most pronounced polymorphous dermatitis while it is lacking in the less doubtful cases of pemphigus.

In another domain, the diagnostic difficulties are known which some forms of herpes, zona, and varicella may bring up. Thus, by the sole means of clinical investigation, the dermatologist may often be wrong. Histology has happily brought valuable

information to the problem.

The very structure of the bulla or blister is profoundly different in pemphigus and in polymorphous dermatitis. In Duhring-Brocq's malady, the effusion follows a plane of cleavage either subepidermal for deep blisters or subcorneal for superficial blisters. In pemphigus, on the contrary, it is a question of a process primarily in the very center of the malpighian laver where it appears, no longer by cleavage, but in the very epidermis itself where a cavity is formed which is filled with "cellular mud" as Civatte calls it.

On the other hand, aside from the development of the bulla, histology has shown us alterations of the malpighian cells which suggested the principles of cytodiagnosis for the bullous dermatitis. In fact, histologic study of bullous lesions has permitted us to point out precisely certain malpighian alterations. Let us state at once that we have not been able to follow all of the different stages, but our surveys allow us to make some statements.

The ballooning alteration has been described by Unna in herpes zoster. Let us remember simply that the ballooning alteration is only the final stage of a series of alterations, including parenchymatous edema which here is not banal, and intercellular collection of the fluid. The cells tend to separate from each other. Some appear hollow, rounded, and empty like balloons (from which is derived the name ballooning alteration), and others are enormous and multinuclear.

Acantholysis is characterized by the disappearance in mass of the intercellular bridges in a large part of the mucous body. Acantholysis is a special phenomenon. Darier and Civatte state that it differs absolutely from the simple temporary loss of the fibrillary apparatus which is seen in simple parenchymatous edema at its beginning.

We thus see that in the epitheliomas which end in a ballooning alteration, the cells lose their intercellular bridges. This is acantholysis. It must be noted, however, that the disintegration of the mucous body does not appear there in mass and is not completed at once. It goes on by eccentric progression around a primitive center composed of a few cells only.

In true chronic pemphigus, the malpighian cells are disassociated throughout the whole top of the mucous body. There are no recognizable centers. Disintegration of the filamentary stratum is here complete.

Contrary to what might be expected, acantholysis is sometimes lacking completely in bullous epider-

molysis.

Finally the phenomenon of segregation has been pointed out and thus described by Darier: "Epithelial cells are isolated and differentiated from the surrounding cells and undergo individually special morphologic and chemical modifications." Starting from this histologic data we can now state precisely the cytologic basis for the cytodiagnosis of bullous dermatitides.

#### CYTOLOGIC BASIS OF THE DIAGNOSIS OF BULLOUS DERMATITIDES

The study of thousands of smears of diverse bullous dermatitides carried on since 1927 permits us to classify the cellular elements into two groups:

1. Cellular elements morphologically normal.

a. These are first blood cells: red cells; polynuclear, neutrophilic, and eosinophilic cells; mono-

cytes; and lymphocytes.

b. Then, histiocytary elements: macrophagic reticular cells, and histiocytic cells from original cell to the adult histiocyte passing through all forms of transition.

c. Finally, epithelial cells torn loose by scarification. They are in groups or isolated, more or less numerous according to the energy of the scratching but of normal morphology and in all cases easily recognized.

2. Cellular elements morphologically abnormal. They concern the malpighian cells and appear

in two types:

a. The segregated type: The epithelial cells have lost contiguous relationship through rupture of the filaments of union. One no longer finds at the level of the isolated elements that irregular arrangement spread around a nucleus, or that geographic contour of the cytoplasm of the normal malpighian cells. And when the spreading of the process has left them grouped in sheets, it is seen clearly that they no longer have the interdependence which they have in normal areas. In all cases the cellular contours assume a regularly rounded form. The cytoplasm in its ensemble presents a color definitely basophilic. Besides, at its periphery it seems to be condensed and this condensation is shown by a sharp accentuation of the basophilia. Each nucleus in the center of the cell seems surrounded by a blue halo. The nucleus itself is rounded, its chromatin is scattered in a fine network in which are distributed little condensations. The color of the ensemble is a deeper red than that of the nucleus of the normal cells. The nucleoli always increase in volume. Generally the ensemble of the cells of a same smear is of identical shape, and this uniformity gives to the spreading-out process a striking monomorphous aspect. But in some cases, elements with burgeoning nuclei and cytoplasm of increased volume are found, so that the appearance is that of cancer cells. We shall see later the significance of these giant cells.

b. The hypertrophied type: The epithelial cells, likewise profoundly modified, appear here in different stages of this modification so that the diffusion assumes an extremely polymorphous appearance. The characteristic element is a giant cell which may attain 8 to 10 times the size of a normal cell. The nucleus is enormous, swollen, forming a somber mass almost homogenous, in which either chromatin or a nuclear network is impossible to distinguish. The cytoplasm is very basophilic, rounded about this deformed nucleus. The whole possible gamut of transitions of shape or form tie this typical figure to elements not exceeding the dimensions of normal malpighian cells, similar to the cells of the segregated or isolated type with a cytoplasm very basophilic, spherical, and condensed at the periphery. But the nucleus, rounded or oval, is very little or not at all nucleated. The chromatin is present there according to the elements in large granulations forming the nodes of a network with large mesh or of a fine confluent reticulum, giving to the nuclear mass a color which is almost without exception somber

#### CYTODIAGNOSIS IN BULLOUS DERMATOSES

We are going to draw up a scheme of the division of these diverse cell types according to the different bullous dermatoses which we have studied:

- 1. The presence of cells of the segregated type, isolated or in panels, always very abundant in diffusion, belongs exclusively to the different forms of pemphigus. We have never been able to find the cytologic image which results from these cells in any other bullous dermatitis.
- 2. Nothing similar is observed in Duhring-Brocq's malady. The diffusion is striking at first glance by its scarcity. It only shows a few rare, normal uprooted epithelial cells, and some elements of the blood. The general appearance is the same as is observed in dishidrosis, the artificial bullous dermitis and the bromide, the iodide, or bullous polymorphous erythema.

3. Finally we have never found hypertrophied epithelial cells at different stages of degeneration

except in zona, herpes, and varicella.

#### CYTODIAGNOSIS OF PEMPHIGUS

The cytologic picture of pemphigus is both so characteristic and so constant that it appears to us to deserve to be considered the best argument for positive and differential diagnosis.

In all cases of pemphigus which we have observed, 31 cases for the years 1949 to 1952, we have always found the same identical and constant pic-

Chronic pemphigus vulgaris. The eye of the examiner of such smears is struck by both the extraordinary abundance of the malpighian elements detached by scratching and the monomorphicity of the diffusion. All the cells, even when they remain grouped in panels, assume a general rounded form corresponding to the disappearance of the intercellular bridges. And an attentive examination shows that they are separated from each other. The nuclei are spherical, slightly hypertrophied, at times of unequal dimensions, but without monstrosities. The chromatin is scattered and diffused in a fine network sprinkled with little masses or heaps. The color of the ensemble is more brilliant than that of the nucleus of the normal cell. The nucleoli increase in volume. The cytoplasm, which is abundant and relatively light-colored around the nucleus, is condensed at the periphery of the cell, forming a very sharp deep blue halo. In the ensemble, the cells are of a dimension not much above normal. All the elements of the same smear are invariably of the same

Subacute pemphigus. Cytodiagnosis often permits us to appreciate the degree of malignancy of the pemphigus in question. In subacute pemphigus, in fact, beside cells similar to those described in pemphigus vulgaris, very large cells of malignant appearance are found. The number of nuclei are voluminous and bourgeoning. Images of abnormal mitoses are present. Some cells are multinuclear. The nueleoli are more voluminous, more numerous, and of an intense blue. These monstrosities at first glance often have the appearance of a malignant tumor. One sees all the interest of this discrimination and the possibility which exists of definitely affirming the malignancy of a pemphigus according to its cytologic aspect.

Malady of Senear-Usher. In the malady of Senear-Usher, which most dermatologists tend more and more to consider a variety of relatively benign pemphigus, we constantly find figures of the segregated type. The cells are small, uniform, and the nuclei have a volume equal to or very little larger than normal. The cells are less abundant than in common pemphigus and scarcely exceed the dimension of

normal epithelial cells.

Finally, cytodiagnosis has permitted us to tie up the malady of Gougerot-Hailey and Hailey to the pemphigus group.

The cytologic diagnosis of pemphigus is not debatable, but is made by the mere appearance of the

smears.

We have never found this picture in any other case of bullous dermatitis. The segregated cells forming a transition with the characteristic hypertrophied cell type of the epithelioses, such as herpes, zona, and varicella, might seem to lead to confusion. Such is not the case, for they are distinguished from pemphigus by their smaller number in a small diffusion, their coexistence with giant cells, and the polymorphism of the nuclear chromatin.

The rounded nucleus is not, or only a very little, altered and the chromatin is present there according to the elements in large granulations, forming nodes of a network with large meshes or of a fine confluent reticulum, which give to the nuclear mass

a color almost uniformly somber red.

The specificity of the cytologic appearance of pemphigus is explained when we refer to the cytologic data previously developed. We have seen that in pemphigus the malpighian cells are disassociated throughout the whole height of the mucous body. There are no longer any recognizable centers. The disintegration of the filamentary stratum is complete. This disintegration is, morever, the reason for the richness of the diffusion of the cellular elements. It is often perceptible before microscopic examination when a sampling is taken. The scarificator which scratches the bottom of the bulla doesn't grate as in other bullous affections and easily detaches the epithelial sample for which one is looking.

#### INTEREST OF CYTODIAGNOSIS IN PEMPINGUS

The interest of cytodiagnosis comes from the facts that have just been presented.

It permits a positive diagnosis of pemphigus. The malady of Senear-Usher can be tied up to the groups of dermatoses of a dystrophic order.

Likewise, subacute pemphigus can be detached from the infectious maladies and inversely related

directly to the group of dystrophies.

It explains to us at the same time the malignant evolution of subacute pemphigus shown in the smears by the presence of segregated cells of monstrous appearance and, by comparison, the relatively benign evolution of the malady of Scnear-Usher where are found not only segregated cells but also normal, small monomorphic cells which are without

All degrees of malignancy from subacute pemphigus up to the malady of Senear-Usher can be found passing through common pemphigus.

We cannot end without emphasizing the specificity of the cytologic aspect of pemphigus, the ease, simplicity, and the rapidity of this method of diagnosis.

Tzanck has explicitly described the epidermal changes which he found in the pemphigus group and asserts the positive diagnostic value of cyto-

diagnosis.

Professor G. H. Percival of Edinburgh has long been recognized as one who has given bullous eruptions careful consideration. He emphasizes the cleavage level in bullous formations and believes that the level of the split has diagnostic value. A summary of his views follows:

The level of the split which results in bulla formation is distinct for each of the four pemphigoid dermatoses, and it remains so throughout the course of the disease. It is, therefore, the only observable feature which is characteristic and constant for a given member of the group and, hence, is the sole reliable diagnostic criterion available at present. When the level of the split is being assessed, the possibility that regrowth of epidermal tissue took place subsequent to the split and prior to the biopsy in or on the original layer which formed the base of the bulla, must be kept in mind. Thus, an initially subepidermal bulla may appear as an intraepidermal bulla, a suprabasal as a mid-rete bulla, and a subcorneal as an intracorneal bulla.

The constancy of the cleavage level, and the accompanying acanthosis in the case of pemphigus vegetans, points to the operation of four different mechanisms. This, taken in conjunction with the respective courses of the disease in each group, suggests four distinct causative factors. The histology throws no light on the probable nature of these factors. On the other hand, histology, by allowing accurate classification, is of immense value in prog-

Cytodiagnosis from scrapings from the base of a bulla (Tzanck test) is a convenient method of differentiating between a subepidermal and an intraepidermal bulla, but it does not indicate the level of an intraepidermal cleavage.

Arthur Rook of Cambridge, England has been one of the most enthusiastic investigators of pemphigus and has been an exponent of Civatte's teachings. He submitted two papers which give his views and the results of his investigations. They are to be published in the *British Journal of Dermatology*.

His conclusions are essentially that analysis of their cases has defined a clinical picture of a bullous eruption differing in many ways from classical Duhring's disease, although sharing with it a histology quite unlike that of pemphigus. This cruption at times may clinically resemble pemphigus vulgaris quite closely, but the diagnosis can often be suspected on clinical grounds. The main differences between the two eruptions can be summarized in table 1.

In general, his conclusions agree with those of Lever (1953). However, in the majority of his cases of pemphigoid, the lesions localized to one region for about three months before the eruption generalized. In Lever's cases, the eruption was widely spread from the beginning.

It seems likely that pemphigus in its various forms will ultimately be proved to be a morbid entity. Pemphigoid is probably a syndrome with more than

one cause.

It will be noted that Rook definitely separates true pemphigus, which he identifies by the symptoms and verifies histologically from pemphigoid, which, although resembling dermatitis herpetiformis microscopically, does not often do so clinically.

Professor X. Vilanova of Barcelona, who has always shown an international viewpoint in his writings, furnished me with an excellent review of his

position on the bullous eruptions:

"We consider that the serious bullous syndromes are to be classified according to their clinical, histologic, and evolutionary characteristics into two groups. On the one hand, the pemphigus group and on the other, the dermatitis of Duhring, and in an intermediate position, the syndrome of Senear-Usher. A series of serious bullous dermatitides whose classification cannot be fixed must also be consid-

TABLE 1

	PEMPHIGUS VULGARIS	PEMPHIGOID		
Sex	Males 3 times as often as females	Equal		
Age	76%, 50 to 70 6% over 70	53% over 70		
Common site of initial lesion	Sealp M. M.	In order of frequency, legs, arms, head, trunk		
M. M.	Common and early	Rare and late		
Prognosis	Uniformly bad	Bad only in aged and when M. M. involved extensively		
Treatment	None	Sometimes controlled by sulfonamides or arsenic		
Course Steady evolu- tion and deterioration		Varied; remissive attacks		

ered. In the first group we include true pemphigus vulgaris, a bullous affection which can develop from a subacute form or as a chronic form and is usually fatal. The attack may be generalized or localized for a long while exclusively in the mucosae.

"The blisters may give rise to vegetations or may be present in the form of initial and persistent foliaceous pemphigus, but usually the vegetant or foliaceous appearance of pemphigus is nothing more than an individual, transitory, and intervening reaction or a characteristic of the final periods. The vegetations, on the other hand, are not exclusively a mark of pemphigus, since they may be found also in the dermatitis of Duhring. The fact that this characteristic represents a form of resistance to the affection cannot be confirmed from the experience we have had.

"The fundamental characteristic of true pemphigus is its lesion, which is histologically made up of an intraepidermal blister with epidermic acantholysis—a typical lesion, that is, bulla which is found in other affections. It is pathognomonic when associated with the clinical and evolutionary character-

istics of true pemphigus.

"The syndrome of Senear-Usher has appearances which may be considered intermediate between pemphigus and the dermatitis of Duhring. Although in this syndrome a histologic lesion similar to true pemphigus is present, the polymorphism of its lesions (eczematoid, seborrheic, macular) and its evolutionary course, which is more benign, differentiate it from true pemphigus.

"The transformation of this syndrome into foliaceous pemphigus is more apparent than real, since the foliaceous phases are much more ephemeral than those of true pemphigus and are produced through the generalization of the lesions and not by stabilization of a morphologic appearance. We believe that diagnostic confusion with foliaceous pemphigus is

easy if this point is not kept in mind.

"The dermatitis of Duhring forms a group of syndromes of different evolution and clinical characteristics whose diagnosis in the serious and often fatal forms results from the elimination of true pemphigus. The fundamental lesion of this group, which is the subepidermal blister, is characterized histologically through total separation and the lack of acantholysis. These syndromes, possibly polyetiologic, are generally polymorphous, of benign course and with apparent remissions, but also they may appear purely as bullae. Their course may be converted into a serious and frankly febrile form, depending largely on the prognosis of the individual defensive capacity. The prognosis is very serious in old people."

These three groups not only are characterized by the type of bullous morphologic lesion but also are similar in their humoral symptomatology, since the apparent hematic differences between true pemphigus, the dermatitis of Duhring, and the syndrome of Senear-Usher in practice are only quantitative and not specific. The changes in the hemogram, the proteinogram, and the hematic chemistry are not of absolute differential value by themselves. They depend upon the seriousness of the picture, the evolutionary periods of the disease, and the individual reaction of the patient.

The histologic lesion, as we have indicated, is on the other hand specific, although not clearly present in all the lesions nor at all stages of the malady, as we must consider the possibility of complications capable of causing a diagnostic error. For example, the finding of a subcorneal blister in one of these groups may indicate an element of associated impetigo.

Conspicuous within the group of nonclassifiable bullous maladies is the malady termed serious, acute febrile pemphigus. This malady, which some consider simply an evolutionary form of sepsis, others a highly acute form of a pemphigus, and some consider similar to the syndrome of Stevens-Johnson, has some characteristics which allow it to be differentiated reasonably precisely from the three remaining nonclassifiable forms.

When the opinions of the authorities are evaluated and an attempt is made to apply the deductions to one's own material and convictions, one realizes that

the diagnosis of the bullous diseases, which in the past have all been considered to be forms of pemphigus, has been greatly refined. The work of Civatte and others, to say the least, has furnished us with a more accurate method of identifying true pemphigus. Whether the so-called pemphigoid will prove to be an entirely separate disease or group of diseases is not settled, but clinicians in the past recognized that patients who had subacute or severe pemphigus had a worse prognosis than those in whom a diagnosis of chronic pemphigus was made. This probably, in present-day terminology, represented a division between pemphigus and pemphigoid. Much still remains to be done to evaluate the so-called pemphigoid disease. Patients must be followed for a long while. Repeated histologic examinations must be made to determine if the bullae remain of one type or if there are transitions to the acantholytic type. The response to therapy with steroids, too, is important.

All in all, the progress made is pleasing and has removed some of the doubt and confusion which was present in every case of pemphigus.

A COMBINATION of crude coal tar and antihistaminic drugs is more likely to alleviate chronic skin eruptions than either agent used alone. When Histar, a preparation of 5% liquor carbonis detergens and 2% pyrilamine maleate in an emulsified hydrophilic base, was applied locally, 35 of 54 patients with atopic eczema had rapid alleviation of pruritus and great improvement in the lesions, report Alex S. Friedlaender, M.D., and Sidney Friedlaender, M.D., of Detroit. Similar amelioration was obtained for the majority of 13 persons with contact-type dermatitis, psoriasis, nummular eczema, or seborrheic dermatitis of the ears. The results were excellent in 44 of the total 67 cases and only 11 of the individuals were not benefited; sensitivity to tar was observed in 3 instances.

ALEX S. FRIEDLAENDER, and SIDNEY FRIEDLAENDER: J. Michigan M. Soc. 53:157-159, 1954.

# Lumbar Traction Therapy and Dissipated Force Factors\*

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Lumbar traction therapy is an accepted procedure for the control of low back and/or sciatic pain which are due to mechanical lesions, most often herniated intervertebral disks. Traction is applied to the legs as a Buck's extension or to the pelvis by means of a belt. Applied weight varies from 5 to 20 lb. on each side, a maximum of 40 lb.

The purpose of this study is to show that these methods fail to produce any stretch force to the lumbar spine, because surface traction resistance of the lower body segment completely neutralizes or dissipates the applied weight. In order to determine the weight necessary to overcome this resistance force, a cadaver and 3 living subjects were studied.

#### DEFINITIONS

Important factors which create and modify surface resistance to traction are: (1) the area of surface contact of the body or body segments upon the bed, (2) the weight of the body or body segments, and (3) the quality, contour, and texture of the contacting surfaces.

The dissipated force factor may be defined as the horizontal dragging force necessary to overcome these combined factors which create resistance. After these resistance factors are overcome, further weight has a stretch effect.

#### METHOD

A hospital bed with a firm mattress was employed for traction studies. The sheets were smoothed, tightened, and fastened at ends and sides. The same pulleys, ropes, and scales were

BERNARD D. JUDOVICH, a 1930 graduate of Hahnemann Medical College, is associate in neurology at the Graduate School of Medicine, University of Pennsylvania. utilized throughout the experiment. Scales were new and checked against weights on a springless balance. The end points of forces applied were obtained by direct reading of scales supporting the weights. Scales at the opposite ends of the segments measured excess pull, and the differences were recorded as the actual surface resistance force.

#### LIVE SUBJECTS

Three medical students were subjected to pelvic traction, using the same bed surface, pulleys, and ropes. They were instructed to completely relax while weight was being applied. Bare skin contacted the sheet. End points were repeated and averaged. Traction was made in the supine position with the bed level and with the foot of the bed elevated 6 in.

#### THE CADAVER

The cadaver was frozen, nonembalmed, well proportioned, nonedematous, and intact. When thawed, the body was without rigor. The body was weighed. Pelvic traction and leg traction were applied to the intact body. The body was then sectioned transversely through L3 and L4 interspace separating it into upper and lower segments. The viscera were cut through and retained in each segment by a plastic cover. The segments were weighed. Traction was applied separately to each segment. A scale was then attached between the upper and lower segments. Leg and pelvic traction was again applied and recorded. Both hip joints were then disarticulated. The pelvis and the lower extremities were weighed; scales were inserted at the hip joints and between the pelvis and upper body segment.

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Traction readings were again recorded. The knee joints were then disarticulated, and all segments were weighed. Traction was applied to all disarticulated segments separately. The recorded forces are averages of 5 to 9 repetitions for each segment and combination of segments.

#### RESULTS

Graphs 1 and 2 and table 1 record total body weights, segment weights, and forces necessary to overcome these weights. The force is also tabulated as a per cent of the body or segment weight.

#### ASCENDING FORCE DISSIPATION

When traction is applied to the lower extremities, the weight required to apply stretch varies according to the level at which stretch force is desired. The higher the segment in which stretch force is desired, the more weight is necessary. Traction loses its effect as upper levels of body segments are reached. For example, 10 lb. of traction would cause a mild stretch at the knee joint, but none at the hip joint. An increase of 20 lb. may provide a mild stretch in the hip joint, but none in the lumbar spine. This progressive requirement of increased traction force as upper segments are reached is due to weight and surface traction resistance of the combined lower segments.

#### ALTERNATE METHOD OF CALCULATION

End points of surface traction resistance were also calculated by the following method:

1. Weight was applied to both the cadaver and live subjects until just sufficient to cause the

TABLE 1

WEIGHT OF PATIENT	DISSIPATED FORCE FACTOR
120	31.2
130	33.8
140	36.4
150	39.0
160	41.6
170	44.2
180	46.8
190	49.4
200	52.0
210	54.6
220	57.2
230	59.8
240	62.4
250	65.0

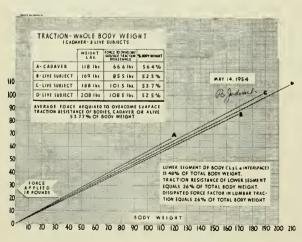
°These figures are believed to be conservative because of the tightened sheets, and the averaging of minimal figures rather than higher figures.

Appreciation is expressed to Dr. L. Richard Schumacher for his valuable assistance in this project.

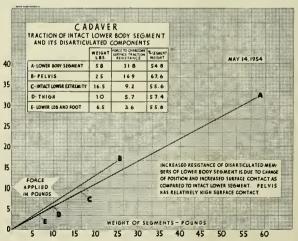
body to slide to the foot of the bed. The required weight calculated as a per cent of body weight was fairly uniform, but necessarily a figure that was greater than the true surface resistance.

2. In the cadaver, with a head-halter and scale attached to the bed, weight was added to the pelvic belt until force registered upon the head-halter scale. The differences between the upper and lower scales were recorded as the true resistance factor for the whole body (recorded in graph).

3. In the cadaver, the difference in the weight required to cause sliding and the weight required in measuring the true body resistance



Graph 1.



Graph 2.

was figured as a per cent of the cadaver body

weight.

4. This per cent difference figure of cadaver body weight was deducted from the force required to cause sliding of the live subjects, as an estimate of true resistance, and the final figures were compared to head-halter scale and pelvic weight differences. All of the final calculations closely approximated each other; 52 per cent to the 56 per cent of the total body weight.

#### OBSERVATIONS

1. The forces necessary to overcome surface traction resistance under the conditions described, whether it be the whole body, cadaver, or living subject, or body segments, are approximately the same — they average 54 per cent of the weight. Tone and elasticity of tissues appear to have no bearing whatever upon the required force.

2. The lower body segment (L3, L4 interspace) composes 48 per cent of the entire body weight. The only traction force which could have any lumbar stretch effect is that which exceeds the amount needed to overcome the surface traction resistance of this segment.

3. Since the lower body segment is almost half the body weight and requires 54 per cent of its weight to overcome its own resistance, 26 per cent of the entire body weight is calculated as an approximate average figure for the force necessary to overcome lower segment resistance.

4. The 26 per cent of the total body weight which is required to overcome the surface resistance of the lower body segment is designated as the dissipated force factor. This force is completely neutralized and lost as a stretch force to the lumbar spine.

When sufficient weight is applied to cause the body to shift slightly toward the foot of the bed, an illusion of end-point weight is created. This is due, however, to the shearing deformity of the mattress. With a resilient sponge rubber mattress, this occurs with much less weight.

In table 1, dissipated force factors are expressed for varying weights. Applied weight equal to the dissipated force factor has no therapeutic stretch effect upon the lumbar spine.

#### COMMENT

These physical observations indicate the inadequacy of lumbar traction as a longitudinal spinal stretch force in therapy.

Example: In the case of a 170 lb. individual, the dissipated force factor is 44 lb., which exerts

no force upon the lumbar spine so that considerably greater weight should be applied. It is quite doubtful that even the 44 lb, could be tolerated as a constant hanging weight. Only weight which exceeds this amount has any stretch effect upon the lumbar spine. The problem is - how much weight? We have shown that in the cervical spine where the structures arc much less dense, 30 to 40 lb, arc required to demonstrate a beginning widening of the intervertebral spaces. If, in the lumbar spine, we use no more than the amount required in heavy cervical traction and add to this the 44.6 lb. required to overcome surface traction resistance, 80 to 85 lb. of traction arc necessary. In all likelihood, even this amount is inadequate because the structures of the lumbar spine are much larger and stronger as compared to those of the cervical spine.

During the past three years, I have used pelvic motorized intermittent traction. Average patients were able to take 75 lb. of traction. In heavier patients, 90 lb. or more were administered. In general, although this method gives a much greater traction force and clinically is far superior to constant weight traction, it is not as satisfactory, nor does it provide the rapid and often dramatic relief frequently obtained with heavy intermittent traction therapy to the cer-

vical spine.

This situation also poses the problem of more effective means of countertraction. My custom had been to elevate the foot of the bed 6 in., a moderate Trendelenburg position, for this purpose. During the course of these experiments all traction, although not here tabulated, was repeated with this 6 in. elevation. It was quite surprising to find only a 5 per cent increase in countertraction. This increase in countertraction produced by the Trendelenburg position is not worth while in view of the resultant dependent headache and the anxiety produced by an unnatural position for prolonged periods. By keeping the bed level, the 5 per cent loss can be more than compensated for by elevating the legs in slings during pelvic traction. This eliminates about one-third of the loss due to surface resistance and keeps the lumbar spine in flexion.

Moderately heavy patients gain about 10 lb. of countertraction if flexed over a firm bolster in the prone position. In addition to this, their pain is lessened and appears to subside more rapidly. The flexion position would seem to be a rational method, just as it is in the cervical spine. Hyperextension appears to cause more

pain in both the cervical and lumbar spine when patients are in the painful state.

#### SUMMARY

Live subject and cadaver studies reveal that the average surface traction resistance of the body is approximately 54 per cent of the total body weight. The lower body segment - transverse section through L3, L4 interspace - weighs approximately 48 per cent of the total body weight. Approximately 54 per cent of the weight of the lower body segment is also required to overcome its surface traction resistance. This is equal to approximately 26 per cent of the total body weight. The force, therefore, that is dissipated with leg or pelvic traction is approximately 26 per cent of the entire body weight. Only adequate weight in excess of this amount has a stretch effect upon the lumbar spine.

Present methods of constant weight traction therapy to the lumbar spine are by far inadequate and produce no stretch effect upon the lumbar spine. This is due to the fact that not enough weight is applied to overcome the surface traction resistance of the lower body segment. A new method is presented for the purpose of overcoming surface traction resistance of body segments.

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## Coronary Pain

A common and at the same time difficult problem encountered by the physician is the patient with symptoms suggesting the presence of coronary insufficiency. In an attempt to learn whether or not a person's discomfort is due to coronary disease, the history, electrocardiographic studies, and response to nitroglycerin are

When the symptoms follow one of the typical descriptions found in the literature, little doubt exists as to the diagnosis. If, in addition, prompt relief occurs with the use of nitroglycerin, the diagnosis is sure. The difficulty arises in the large number of cases not fitting the classical patterns.

The electrocardiogram is usually perfectly normal between episodes of pain. Therefore, attempts must be made to record electrocardiograms during an attack. In the individual with infrequent discomfort, exercise in the form of 15 to 20 knee bends may be employed as a precipitating factor. However, a normal exercise electrocardiogram does not rule out coronary disease. At times the characteristic electrocardiographic changes do not occur for five to ten minutes or more after the exercise.

Another method consists in reproducing in the office whenever possible the identical condition under which the pain occurs spontaneously. For example, if the individual's difficulties arise immediately after a meal, upon walking after a meal, or upon lying down after a meal, the patient has lunch in the office and then walks or lies down. Electrocardiograms are taken as soon as the discomfort begins and even when absent. Occasionally serial tracings over a period of a few days of recurring

attacks show progressive changes and indicate a coronary origin. An unchanging electrocardiogram even if abnormal does not warrant a conclusion.

All too frequently the previously described examinations are normal in a patient subsequently proved to have coronary disease. In such cases, the patient's description of his symptoms is valuable in reaching a conclusion.

A sensation of pressure, constriction, dull ache, burning, numbness and tingling, or sharp pain may be noted. The location of the discomfort varies greatly from patient to patient but shows a pronounced tendency to remain the same with each attack in the same person, although often extending to wider areas during prolonged attacks. The manner in which the discomfort spreads is also usually characteristic for each patient, In essence, the pain or coronary insufficiency may occur in almost any part of the upper half of the body either primarily or as immediate or later radiation. Although the location may be bizarre, the stagelike progression of pain during repeated paroxysms, is strongly suggestive of coronary insufficiency.

In studying the circumstances associated with the symptoms and the duration of the pain, a wide variability, embracing even some phenomena appearing incongruous and paradoxical, is found. Recognition of this variability and of the incongruous and paradoxical behavior is necessary to avoid ruling out the presence of coronary disease, because a more classical description of the malady is not obtained. The important point to realize is that in any given case a tendency exists for the various patterns to remain constant, the location pattern, the circumstance pattern, and the duration.

# Fire and Explosion Hazards in Hospitals

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RAGEDIES From these and capacity rooms ever curred in operating and delivery rooms ever been Tracedies from fires and explosions have ocsince flammable anesthetic agents have been used. It is true that such accidents are rare and occur only once in approximately 80,000 to 100,000 anesthesias. However, definite hazards are present in places where flammable anesthetic agents are used. Therefore, definite precautions must be taken to avoid or, at least, further minimize these catastrophes since there are over 10,000,000 anesthesias administered in the United States annually.

The danger of fire and explosion is not limited to the field of medicine but is also a factor in industry where flammable agents are used in the manufacturing of many products. However, industry has taken definite steps to minimize these hazards by improvements in the physical plant and by intensive instructions to personnel on safety measures. This practice has not been the general rule in most hospitals where flammable anesthetic agents are used. The hospitals alone cannot be accused of negligence along these lines. Until recently, recommendations made to hospitals for the prevention of fires and explosions have been so variable and controversial that the requirements have been difficult to fulfill. However, today, we have nearly reached agreement on the solution of many of these controversial problems.

#### FACTORS CONDUCIVE TO EXPLOSIONS<sup>1</sup>

The three essential factors required for the development of an explosion are:

1. Combustible gases or vapors. In ordinary anesthesia practice, the gases or vapors are ethylene, cyclopropane, diethyl ether, and divinyl ether, or a combination of these. We must not

exclude the nitrous oxide-oxygen-ether sequence, because this mixture is also flammable.

2. Oxygen supply. Oxygen is essential to all ordinary combustion. In anesthesia, oxygen is supplied pure, diluted in air, or in chemical combination with nitrogen in nitrous oxide.

3. *Ignition source*. Flammable mixtures require an ignition source for an explosion to occur. Ignition sources may be small flames, incandescent surfaces, local combustion initiated by catalysts, and electric sparks.

Factors 1 and 2 are essential to practical anesthesia. However, the third factor, the ignition source, is not essential and should be controlled

or eliminated (table 1).

Open flames, such as those provided by alcohol lamps, Bunsen burners, matches, and smoking should be prohibited in rooms where anesthetics are either administered or present.

The use of incandescent or high frequency cauteries or coagulators within a distance of 2 ft. from the mouth of a patient receiving flammable anesthetics should be prohibited unless a rubber sheet and wet drapes are properly applied.

On rare occasions, explosions of ether (from peroxides) have occurred due to the effect of sunlight. Ether should always be stored in original cans or dark glass bottles. Unless amber glass jars are supplied by the manufacturers, any ether remaining in the anesthesia machine should be removed and properly stored at the end of the day's work.

Electrical equipment should be inspected frequently to detect faulty operation, broken switches and plugs, frayed cords, and open sparks. Unless the equipment is explosion proof, it should not be used where concentration of flammable anesthetic gases may be present.

Roentgen ray and fluoroscopic equipment can cause fire or explosion when flammable anesthetic agents are being used. Roentgen ray apparatus is often brought into the operating room during the administration of an anesthetic agent. Modern shockproof equipment decreases the

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TABLE 1 LIMITS OF FLAMMABILITY OF ANESTHETICS

	Density of air taken as 1	LIMITS OF FLAMMABILITY					
Anesthetic agents		In air Lower U	pper	In ox Lower	xygen Upper	In nitro Lower	us oxide Upper
Ethylene	0.97	3.05 2	8.6	2.90	79.9	1.90	40.2
Propylene	1.45	2.00 * 1	1.1	2.10	52.8	1.45	28.8
Cyclopropane	1.45	2.40 1	0.3	2.48	60.0	1.60	30.3
Ethyl chloride	2.23	4.00 1	4.8	4.05	67.2	2.10	32.8
Ether-divinyl	2.42	1.70* 2	7.0 °	1.85	85.5	1.40	24.8
Ether-diethyl	2.56	1.85* 3	6.5°	2.10	82.0	1.50	24.2
Nitrous oxide	1.52	Not flamm	able	Not fla	mmable	Not fla	mmable
Chloroform	4.12	Not flamm	able	Not fla	mmable	Not fla	mmable

<sup>\*</sup>Tests made in 8 liter, cylindrical, closed steel bomb.

hazard of fire and explosion but does not eliminate it entirely.

#### STATIC ELECTRICITY

Static electricity, which is electricity at rest, is the cause of a high percentage of explosions in hospitals. It is usually produced on nonconductors but can be transferred and retained on insulated conductors.

Friction between dissimilar, nonconductive materials produces static charges. Some examples of this are the shuffling of feet across a rug on a dry day, running a comb through the hair, rubbing a glass rod with silk or synthetic fabric, and separating blankets or unfolding them. Static charges can be generated by frictional contact and separation of woolen garments, upholstcred furniture, and so forth. Static charges can also accumulate by inductive processes on articles that are near electrically charged objects.

Most materials permit electricity to pass through them, but some materials are such poor conductors that they are considered insulators. Metals and carbon are good conductors, whereas acids, salt solutions, plants, and animals are relatively poor conductors. Various oils, dry wood, silk, rubber, plastics, glass, and air are considered insulators.

Development of clectrostatic charges in the average operating room are impossible to prevent. There is so much activity that frequently frictional contact occurs with one or another of the many nonconductive materials that are present in the room, and charges are thus generated.

The only means of preventing the accumulation of static charges thus produced is to provide paths by which the electrostatic charges may flow away as fast as they are generated. This can be done through the use of conductive floors and efficient conductive contact thereto. All movable conductive objects and personnel present in a room where flammable anesthetic agents are administered should have proper electrical contact with the floors.

#### GROUNDING

Grounding chains are useful for removing static electricity from operating room equipment only if the following conditions are observed:

1. The floors must be definitely conductive or have metal dividing strips closely spaced.

2. The chains should make long-line contact with the floor if the floor is conductive, or with at least two metal strips if it is not. Chains which are so short that only one or a few links are provided in contact with the floor cannot be relied upon to remove static. Long chains on tables, stools, carriages, gas machines, and so forth, will not be in the way if they are placed diagonally underneath the equipment. To insure greatest benefit, two diagonal chains should be used on each piece of equipment.

3. Chains should be cleaned occasionally to remove dirt, wax, grease, soap, oxide films, or other foreign substances which may accumulate between the links and cause high resistance. A stiff brush and a greascless detergent should be used for this purpose.

4. Chains having open links are preferable to those of the ball or beaded type, which have conductive parts that are inaccessible for cleaning. They should be of material that will not rust or give off abrasive sparks when dragged over concrete or other hard surfaces.

If the floor has high resistance, the problem of grounding is solved satisfactorily by the use of one moistened and two wet towels or any other sizeable pieces of fabric. The moistened towel

<sup>&</sup>lt;sup>1</sup>Jones, G. W., Kennedy, R. E., and Thomas, G. J.: Technical Paper 653, U. S. Bureau of Mines, 1943.

is folded lengthwise; one end is placed under the patient's shoulder, against the bare skin, and the other end is tucked between the mattress and the top of the operating table. One wet towel is laid above the easter from the base of the table to the floor toward the anesthetist's foot. The other wet towel is stretched from the foot of the gas machine to the floor. The anesthetist's foot and the stool touches one or both of the towels. Moistened and wet towels employed in such a manner provide excellent interconnection and grounding even though a standard test may indicate high floor resistance (figure 1). The explanation for this recommendation is as follows:

Conduction of electricity to ground through a floor is accomplished through many paths of high resistance. When a contact to the floor is made with a chair, plate, or a chain, only a few of the available paths to ground are used. When contact is made through a large wet towel, cloth, or pool of water placed on the floor, thousands of such paths are made available and the neutralization of charges is easily accomplished.<sup>2</sup>

#### CONDUCTIVE FLOORS

The floor is usually the most convenient common path for electrical charges to follow. Floors made of rubber, linoleum, tile, or marble are very poor electrical conductors. Neutralization of charges through such floors requires considerable time. A dangerous spark may occur before the neutralization is complete.

A terrazzo floor with conductive metal grilles



Fig. 1. Method of using wet towels for removal of static electricity during anesthesia.

may or may not be sufficiently conductive. Several other types of satisfactory conductive floors are on the market and new ones are appearing from time to time. In planning the installation of conductive floors, consideration must be given not only to conductivity but to cost, durability, and appearance.

#### HUMIDITY

Many anesthetists believe that an atmosphere of high humidity prevents the accumulation of static electricity and thereby eliminates explosions caused by electrostatic charges. However, several explosions have been reported with the relative humidity at 65 per cent. In April 1949, an explosion attributed to a static spark occurred when the relative humidity was 76 per cent.

Air-conditioned operating rooms are certainly desirable, but some authorities are of the opinion that artificially conditioned operating rooms are more dangerous than nonconditioned rooms, due to the removal of carbon dioxide from the air. These authorities believe that it is the carbon dioxide in the humid atmosphere which is effective in giving conductivity to insulators.

While this seems plausible, it is not altogether true, because most chargeable surfaces and insulators in operating rooms are contaminated with dust, soap films, and so on, which probably furnish more ions in solution than would be furnished by the carbon dioxide. Unless the relative humidity is high, it may not prevent the possible electrification of rubber parts, woolen blankets, and synthetic fabrics. Furthermore, unless the equipment is in constant operation and in permanently good condition, it may fail to provide protection when it is most needed.

#### ELECTRICAL EQUIPMENT

Receptacles and plugs which cannot be pulled apart accidentally should be installed where needed. They should not be placed in or near the floor where heavy anesthetic gases are apt to pass over them, and they should be well out of the range of combustible gas mixtures. This precaution also applies to heaters, open motors, and switches.

In new building construction, the electric wiring should conform with the latest approved regulations of the National Fire Protection Association and the National Electrical Code.

#### ANESTHESIA EQUIPMENT

Each gas machine should be equipped with conductive rubber breathing tubes, mask, and bag. Many of the conductive rubber breathing tubes today have connectors at each end made of plastic or some other nonconductive material. All connectors should be metal or of some other conductive material, or the purpose for which they were made is defeated.

High resistance rubber casters are still present on most gas machines today. Heavy bronze or copper window-sash grounding chains should be installed on all anesthetic equipment and operating tables, provided the floors are definitely conductive or have closely spaced metal divid-

ing strips.

It is always dangerous to move anesthetic appliances and extreme caution should be exercised, especially when they are moved across nonconductive floors. Altering the connection or changing connections during the course of anesthesia is hazardous and should only be done with extreme care. The safest procedure is to move the patient with the gas machine completely disconnected.

#### OPERATING ROOM EQUIPMENT

Mattresses, pads, and pillows should be covered with conductive rubber. All stretcher carriers should be equipped with the same, especially in buildings where nonconductive floors are still in use.

Operating tables, anesthetic stands, stools, and instrument tables should be equipped with a conductive material at the points where they make contact with the floor. Stools should be either left bare or else covered with conductive materials.

Endoscopic instruments which operate on 6 or 8 volts do not constitute a hazard.

Wool blankets, plastic sheets, and most of the usual synthetic fabric materials should not be used in the operating room. Cotton blankets are satisfactory, but if they are kept in warming compartments, some means should be provided to keep them from losing moisture.

#### PERSONNEL

Cotton uniforms are desirable from an electrical standpoint because they retain a satisfactory conductivity at fairly low humidities, and because they do not produce or acquire charge by frictional contact with other much used cotton articles, such as sheets, bandages, sterilized bundles, and so forth.

Conductive shoes should be worn by all hospital personnel. Personnel wearing ordinary rubber or synthetic soled shoes may be static car-

riers regardless of the type of floors in use. Soles of leather or other absorbent material can be brought to the desirable value of 1 megohm or less in a few minutes by standing on a wet pad.

#### IMPORTANT THINGS TO REMEMBER<sup>3</sup>

1. Avoid wool, silk, nylon, sharkskin, nonconductive rubber, plastics, and so forth, in anesthetizing locations.

2. Keep visitors away from the anesthetist and his equipment when using flammable anesthetic

agents.

3. Use extreme caution in moving anesthetic

appliances.

4. Exercise caution in connecting and disconnecting masks, breathing bags, or tubes because handling is capable of producing electrostatic charges.

5. Conductive soled shoes should be worn by hospital personnel. If these are unobtainable, leather soles are less objectionable than ordinary

rubber or composition shoes.

6. Conductive floors should be installed in all

anesthetizing locations.

7. All equipment on the floor should make

proper electrical contact with the floor.

8. Paper wrappings should be removed before placing gas cylinders in service so that the cylinder label may be clearly visible.

9. Do not permit oil, grease, or flammable liquids to come in contact with oxygen cylinders,

valves, regulator gauges, or fittings.

10. Do not lubricate regulators, fittings, or gauges with oil or any other combustible substance.

11. Always clear the particles of dust and dirt from the outlet of each cylinder by slightly opening and closing the valve before applying

any fitting to the cylinder.

12. Do not permit oxygen to enter the regulator suddenly. Open the valve slowly. When opening the valve, point the face of the regulator gauge away from the operator and other personnel.

13. Do not use oxygen fittings, valves, regulators, or gauges for any service except oxygen.

14. Gases should never be mixed in or added to an oxygen cylinder or any other cylinder by hospital personnel.

15. Do not attempt to use regulators that are in need of repair, or cylinders having valves

that do not operate properly.

16. Do not attempt to repair defective oxygen equipment unless properly trained and qualified for such work.

17. Cylinder valves should be fully opened when in use.

18. Cylinder valves should be closed at all times except when gas is actually being used.

19. Employ block anesthesia or spinal analgesia or produce anesthesia with nonvolatile agents when these are suitable.

20. Use the carbon dioxide absorption technic in the administration of inhalation agents. The anesthetist should carefully observe the following routine: (a) Touch the patient and the gas machine before releasing vapors or gases. (b) Bring the mask into contact with the face after it has been connected with the apparatus. (c) Allow only a non-flammable mixture to flow until all contacts are made. A low oxygen concentration might be used for the first half minute of the induction period. (d) Use deliberation in all movements. Break and remake connections of the mask with the patient and of parts of the breathing apparatus only when each part is in your own hands.

Finally, always be on the alert against that silent, unseen hazard that is least understood and most neglected—"static or frictional electricity." A spark that can scarcely be seen or felt can prove disastrous.

#### SIMPLE AND RELIABLE TEST<sup>4</sup>

Nonflammable anesthetics should be employed when electrocoagulating or fulgurating apparatus is used in connection with eye, ear, nose, or throat surgery. However, in the event that a patient, already anesthetized with a flammable mixture, requires electrocauterization in the vicinity of the neck or face, the following procedures are recommended:

1. Discontinue administration of the anesthetic and move the equipment to a place at least 5 ft. away from the patient.

2. Allow the patient to breathe room air for not less than three minutes.

3. Insert a 10-cc. syringe halfway into the oral cavity, and take a sample of the exhaled gas from the patient as illustrated in figure 2.

4. Without moving the plunger, carry the syringe containing the sample of exhaled gas, as shown in figure 3, to a nearby room where an alcohol lamp may be safely lighted.

5. After the lamp has been lighted by an assistant, remove the plunger of the syringe and bring the mouth of the barrel into contact with the flame, as illustrated in figure 4. If any flammable gas is present in the barrel, it will be ignited and a puff of flame will be seen. Electro-





Fig. 2 (above). Method of drawing sample of exhaled gas and air. Fig. 3 (below). Sample being taken to a safe place for open-flame test.

cauterization should not be attempted until a sample of the exhaled gas gives a negative test.

This simple procedure has been employed at St. Francis Hospital for the past 15 years and we have found it convenient and reliable.

#### CONCLUSION

Manufacturers, architects, and builders concerned with hospital construction, should be thoroughly familiar with the hazards common to anesthetizing areas and should supply materials and construction that conform with modern safety code requirements.

Hospital management should be grateful for the intense interest being shown at present in



Fig. 4. Plunger removed and mouth of syringe barrel applied to alcohol lamp flame.

safety, and should regard it as a duty of the surgeons, anesthesiologists, nurses, and other operating and delivery room personnel to be thoroughly instructed in all of the eauses of anesthetie fires and explosions. This duty should be impressed upon each member constantly, and a method should be devised to insure complete adherence to all recommended precautions.

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## Book Review on Pain

SACRAL NERVE-ROOT CYSTS: ANOTHER CAUSE OF THE SCIATIC OR CAUDA EQUINA SYN-DROME, by I. M. Tarlov, M.D., professor of neurology and neurosurgery, New York Medical College, New York City, 1953. Springfield, Illinois: Charles C Thomas. 134 pages. Price \$6.50.

This book comes as a revelation to all physicians. The subject is thoroughly developed and illustrated and the mystery of many complaints which heretofore have not been diagnosed and, therefore, have not been treated is cleared. Symptoms associated with eysts on the nerve roots that are hidden in the eaudal eanal of the sacrum have not received their proper attention until now.

This book should be read by every member of the medical profession. It is printed on excellent paper and is easy to read; the illustrations are particularly effective. In the first chapter the author gives the historical background of eysts of the saeral nerve roots. In 1931, at the Royal Vietoria Hospital in Montreal, he did a rather eomplete dissection of the lower end of the spinal eord with the saeral nerve roots and ganglia attached. In regard to this study he made the following statements: "Five out of 30 dissections revealed cysts of the posterior sacral nerve roots and ganglia. . . . The eysts arose from the perineurial space . . . and often destroved much of the nerve root and ganglion. Often they compressed neighboring nerve roots and, oeeasionally, the theeal sae. All eysts were hidden under the posterior areh of the saerum, a region seldom explored at autopsy, much less at operation . . . , which explains why these lesions had theretofore been overlooked.'

The second chapter deals with the structure of nerve roots so that the reader ean understand how and why lesions develop. Diagrams are employed to make the anatomie facts elear. The structure of the filum terminale is discussed in detail in ehapter three and illustrations, photomierographs, and diagrams are included. In chapter four the topic is the relation of meninges to nerve roots and filum terminale, and a table is included which shows the length of each of the spinal nerve roots. The length varies from 3 mm. for the first eervieal, or C-1, to 266 mm, for the first eaudal. The location and gross appearance of sacral perineurial cysts are described in chapter five and again photographs of speeimens and photomierographs are employed. The histology of perineurial eysts comprises the text of ehapter six and the pathogenesis of these eysts with illustrations, particularly photomicrographs, to give all necessary information comprises chapter seven. Chapter eight is devoted to the elinical significance of the lesions. Cases are presented including descriptions of the operative technic with photographs of specimens, photomicrographs, and panto-paque evidence. In chapter nine diagnosis and the methods used are considered and chapter ten is concerned with operative management and results.

Chapter eleven presents the author's eonclusions which are as follows:

"1. Sacral perineurial eysts are relatively eommon and

ean produce symptoms. "2. Perineurial eysts have been found also on thoraeie nerve roots and may aeeount for various thoraeie pains. It seems likely that further experience will reveal their presence on other spinal as well as on cranial sensory

roots and ganglia.

"3. Histological studies show that the eysts arise at the junction of the dorsal root and ganglion. They begin in the perineurial space and may surround or invade the entire root or dorsal ganglion. Tracing these cysts in serial sections shows that they begin in the perineurial space, between the endoneurium derived from the pia mater and the perineurium formed by the arachnoid.

"4. Early eysts are often indicated macroscopically by a wrinkling or a translucence of the epineurium and perineurium over the proximal pole of the dorsal ganglion and the posterior nerve root. The eysts may attain a diameter of 3 em. and severely compress surrounding nerves or even the tip of the dural sae.

"5. Occasionally lymphoeytes occur in the ganglion or nerve near the eyst, but inflammation is not common in

these lesions.

"6. The eysts may result from subarachnoid hemorrhage, which migrates, to a limited extent, along perineurial spaces and then distends and ruptures veins in the nerve root and ganglion, or infiltrates these struetures directly. The absorption of the hemorrhage and destroyed nerve tissue leads to eyst formation.

"7. The presence of rarefied neural tissue and also cavitation accompanying thickened blood vessels suggests that isehemie eell degeneration may eause eysts. Marked degeneration of the nerve root or ganglion without eavitation also occurs. Many obscure eases of seiatiea with

(Continued on page 421)

## **Editorial**

All inquiries and manuscripts for the Section on Pain should be sent to Dr. John S. Lundy, 102 Second Avenue S.W., Rochester, Minnesota, or to the Editorial Department, THE JOURNAL-LANCET, 84 South Tenth Street, Minneapolis 3, Minnesota.

#### THE PROPHYLAXIS OF PAIN

R. George J. Thomas is one of the most experi-Denced physicians in anesthesiology in the field of problems of fire and explosion hazards in the hospital. At our request he has prepared a paper on that subject. At first glance it might seem inappropriate for the Section on Pain to present a paper on that subject, but it should be remembered that the Section on Pain is concerned with the prophy-

laxis of pain as well as any other considerations of it. The pain that can be a consequence of fire and explosion in a hospital may be severe and intolerable. It certainly is something of major concern to any well-conducted hospital. Dr. Thomas has concerned himself very largely with fire and explosions of electrical origin. Preventive factors against other types of fire and explosion which might be mentioned are plastic, nonbreakable containers for inflammable agents of any kind which are used in the operating room. The board of health in each state has now begun to set up regulations concerning fire and explosion hazards, and will withhold approval of, or even permission for, the operation of a hospital unless these conditions are met. Hence, it is particularly opportune now to make much of the necessary information in respect to fire prevention and the prophylaxis of pain available to the readers of The JOURNAL-LANCET.

JOHN S. LUNDY, M.D.

#### BOOK REVIEW ON PAIN

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or without motor or sensory abnormalities may thus be

explained.

"8. The development of slowly progressive changes referable to the sacral or coccygeal part of the cauda equina should lead one to suspect these cysts. The cysts produce syndromes referable to the sciatic nerve or the caudal nerve roots - paraesthesias of the penis or vagina, urinary disturbance, and sensory changes over the buttocks and perineal area.

"9. They should be suspected also in cases of the sciatic syndrome when operation reveals no herniated in-

tervertebral disk or any other adequate cause.

"10. Pathologic studies have revealed perineurial cysts on the coccygeal as well as on the lowest sacral nerve roots. It therefore seems possible that such cysts may be at the root of certain cases of severe coccydynia. Because a cyst was encountered on a mid-thoracic nerve root in one autopsy case, it seems possible that they may cause pains elsewhere as well.

"11. Erosion of the overlying posterior sacral arch may occur. This was present in two of the 10 collected cases. "12. Cerebrospinal fluid analysis may show a mod-

erately high total protein.

"13. The cysts do not communicate directly with the subarachnoid space, and they usually originate below the end of the thecal sac. Myelography will therefore usually fail to reveal any abnormality. In two of the seven collected cases, however, myelograms revealed cysts.

"14. Total excision of solitary perineurial cysts is the treatment of choice. The ventral root should be spared

if possible.

"15. Multiple cysts occurred in 3 of the 10 collected

clinical cases and in about half of the 10 autopsy cases. Piecemeal excision of multiple cysts is advised, but, to minimize possible postoperative complications, as much of the intact nerve root as possible should be spared. Further clinical experience may modify this practice.

"16. Complete recovery followed excision in the four patients with solitary perineurial cysts. Partial relief followed piecemeal excision or incision and drainage in the

two patients with multiple cysts.

"17. Simple decompression of sacral perineurial cysts is ineffective in giving relief. . . . Incision and drainage of the cyst resulted in only temporary recovery in one patient. . . . The recurrence of symptoms was probably due to healing of the incision and reinflation of the cyst. The symptoms subsided, however, after conservative treatment of this patient. Certainly complete excision of solitary cysts, sparing the anterior root if possible, is the operation of choice.

'18. The results of surgical treatment of sacral perineurial cysts are gratifying. They justify intensive clinical efforts to identify the symptoms and signs of this removable cause of sciatic and sacrococcygeal syndromes.

"19. Because of the manifold symptoms caused by sacral perineurial cysts, patients consult neurologists, psychiatrists, urologists, orthopedists, or gynecologists. "20. As clinicians become increasingly aware of sacral

perineurial cysts, the number of recognized cases will doubtless increase.

'21. To find these cysts, the posterior sacral arch must be unroofed. This procedure is simple, but in the past has been rarely resorted to, a fact that accounts for the oversight of these lesions."

The author has included a rather complete bibliography and the book is well indexed.

JOHN S. LUNDY, M.D.

### Current Literature on Pain

THE EFFECT OF ANALGESIC DRUGS ON THE SENSATION OF THERMAL PAIN IN MAN. HAR-OLD JACKSON, M.D. Brit. J. Pharmacol. 204-214, 1952.

Exact measurement of a thermal stimulus applied to the skin is difficult. In 23 subjects, the temperature at which a thermal stimulus was first perceived was unaffected by therapeutic doses of morphine or diamorphine. Induetion of asphyxia in the area stimulated or inhalation of nitrous oxide also did not elevate threshold temperature.

While previous studies indicate that thermal pain perception is apparently abolished in the rat by morphine and related compounds, raising reaction temperature from 38 to 48° C., the thermal threshold in man is very

resistant to elevation.

Relatively large intravenous doses of morphine and diamorphine raised the threshold by as much as 4° C. to 48 to 49° C. in a few human subjects. This increase appears to be the maximum attainable in man and eorresponds with the maximum temperature of response ob-

served in the rat.

As a result of this relatively small temperature rise, the large dose of opiate required, the uncertainty of response in different subjects, and the unpleasant side effects of the drugs, the use of thermal stimulation for the assessment of a drug's analgesic potency is impraetieable.

DIAPHRAGMATIC HERNIA SIMULATING THE PAIN OF HEART DISEASE. JOE E. HOLOUBEK, M.D., W. H. CARROLL, M.D., RICHARD B. LANGFORD, M.D., and G. M. RILEY, M.D. New Orleans M. & S. J. 104:712-715, 1952

Esophageal hiatal hernia may produce pain similar to

that of coronary artery disease.

To ascertain the presence of esophageal hiatal hernia by fluoroseopie study, the patient is placed in the Trendelenburg position and the Valsalva maneuver is performed immediately after the barium is swallowed. Other diagnostie procedures should include repeated electrocardiograms with tracings taken before and after the exercise test.

In 27 patients, pain, previously diagnosed as eoronary artery disease, was demonstrated to be due to esophageal hiatal hernia. These patients present a complaint of substernal pain, often radiating to the left shoulder and usually occurring at rest and after a full meal. Sitting in a cramped position as in driving a ear or wearing a tight abdominal binder precipitates the pain. Most patients say the pain occurs when they lie down and turn on the left side. Exercise does not bring on, but may aggravate the pain after a heavy meal.

A majority of the patients are males, obese, and hypersthenic with an age range of from 23 to 73 years. The electrocardiographic changes consisting of transient low T-waves in lead 1 are interpreted as reflecting vasospasm caused by pressure. Exercise tests did not produce electroeardiographie changes. Many patients showed associated symptoms of indigestion.

Treatment. In 3 patients, the defect was corrected surgically. A majority can be treated medically by reduction of body weight, antispasmodics, small meals,

and lying in a semisitting position.

SKIN WHEALING FOR ANALGESIC PURPOSES; A VALUABLE ADDITION IN TRAUMATOLOGY. EMANUEL R. N. GRIGG, M.D. South Dakota Med. & Surg. 5:79-81, 1952.

Analgesie results of skin whealing by the injection of procaine or normal saline are encouraging. Parasympathetie tone is increased, possibly liberating acetyleholine, which blocks the road for pain sensations. Since several body locations exist where a cholinergic reflex may abolish transmission of a particular pain, skin whealing is done at these so-called analgesiogenie points.

The patient is asked to place a finger on the most painful spot. Then a 0.5 em. diameter intradermie wheal is infiltrated, using the same steps with the needle parallel to skin as in any intradermal test. Either normal saline or 1 per cent procaine are satisfactory, and 25-gauge, short-bevel needles are preferred. After each injection, the patient again indicates the most painful spot, and another wheal is placed. This procedure is repeated until complete analgesia is obtained.

Skin whealing gives substantial relief for pain of traumatie origin. Sometimes freedom from pain is sufficient to allow elosed reduction of a bone displacement or the appliance of a east. Residual pain during traction and later during mobilization also yield to skin whealing.

The method is particularly useful in sprains of any articulation in the body. The procedure gives excellent results in cases of edematous joints where deep procaine infiltration is contraindicated. Muscular or articular pain, low or high backache, and sciatic neuralgia are also indieations for its use.

For pains eaused by internal diseases, results have been contradictory, possibly because of difficulty in locating analgesiogenie points. Most ehest pains, however, including angina pectoris and coronary occlusion, may be abolished.

Advantages of skin whealing are obvious. The proeedure is nontoxie, not habit forming, and the teehnie is simple and fairly painless if correctly instituted.



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## A.C.H.A. News

Dr. Dana L. Farnsworth, whose medical health program at the Massachusetts Institute of Technology has gained nationwide acclaim, has been selected by president Nathan M. Pusey as Henry K. Oliver professor of hygiene, to direct all medical care in Harvard University, effective September 1.

As the first full-time medical director at the Massachusetts Institute of Technology, Dr. Farnsworth established there a student insurance plan and expanded the medical, psychiatric, dental, x-ray, and occupational medicine services. His Harvard appointment will be considered at the fall meeting of the board of overseers.

Dr. Farnsworth's basic medical training was in the field of internal medicine, and in this field he is an associate physician at the Massachusetts General Hospital. At the same time he is a recognized authority on psy-

chiatry and mental hygiene.

Dr. Farnsworth was born April 7, 1905 at Troy, W. Va. He received his A.B. degree in 1927 and B.S. degree in 1931 from West Virginia University and his M.D. degree from Harvard Medical School in 1935.

After graduation from the Harvard Medical School and a period of training in internal medicine at the Massachusetts General Hospital, Dr. Farnsworth was named assistant director of health at Williams College in 1935 and in 1945 was named director of health. He was appointed medical director at the Massachusetts Institute of Technology in 1946 and during the academic year 1950-51 served as acting dcan of students.

During World War II, Dr. Farnsworth served as a commander on active duty with the Medical Corps of the U. S. Navy. During the early part of the war he was a medical officer aboard the USS Solace in the South Pacific. Other duty included assignments on the staff of naval hospitals in Philadelphia; Oakland, California; Bethesda, Maryland; and Palm Beach, Florida. For the past seven years he has been a consultant in neuropsychiatry at the U. S. Naval Hospital, Chelsea, Massachusetts.

Dr. Farnsworth is a diplomate of the American Board of Psychiatry and Neurology, a fellow of the American Psychiatric Association, and a past president of the American College Health Association. He was chairman of the Fourth National Conference on Health in Colleges held this year in New York City.

He is married and lives in beamont, Massachusetts.

Dr. Bock, who retired this year after some thirty years of service at Harvard, has been the Oliver professor of hygiene since 1935.

On September of this year, the Columbia University health service will open in new quarters. For many years the medical office has operated in "temporary" rooms entircly unfitted for medical work with 2 infirmaries located in 2 dormitories -1 male and 1 female.

After several years of negotiation and planning, the decision was made to house our facilities in a new building to be enacted by St. Luke's Hospital located adjacent to one corner of the university campus.

The building is a modern, 10-story hospital built primarily to house the St. Luke's O.P.D. and ancillary facilities, although the upper 4 floors will house patients.

The Columbia Medical Office will occupy half of the second floor with a total of about 9,000 sq. ft. of floor space. This will be ample to serve as an outpatient

service, with 10 to 12 consulting-examining rooms, a minor operating room, physiotherapy room, psychiatric office, and an employees unit. Service laboratory and x-ray facilities will be handled in the St. Luke's departments on adjacent floors. Space for these, except for a small routine lab and a fluoroscopic room, has not been needed

On the ninth floor will be the infirmary with 48 beds—single, double, and 4-bed rooms. The ward, private, and operating room facilities of the hospital will be at our disposal when needed. A large part of our staff will be members of the St. Luke's staff. St. Luke's Hospital is also one of the teaching affiliates of the medical school.

Direct affiliation of our service with the Columbia Presbyterian Medical Center, although in many ways desirable, is impractical because of geography, there being three miles between us.

C. R. Wise, M.D., University Physician

. . . .

The secretary's office frequently receives letters from physicians interested in entering student health work, or who desire changes in location. Our office will appreciate hearing from any health service officer or other college administrator where a vacancy exists in student health work, for which help is desired in obtaining the names of prospective or interested candidates.

We shall also appreciate notification from the college or university when such a position is filled in order that our records may be made complete, and that the name of the newly appointed physician may be entered on

our books.

This office stands ready at all times to be of assistance to health service personnel or college administrators concerning any problem of student health policy or administration. Such inquiries are welcome, and will either be answered directly or referred immediately to the proper authorities for answer.

Address all such communications to: Irvin W. Sander, M.D., Secretary-Treasurer, American College Health Association, Wayne University, Detroit 2, Michigan.

# News Briefs . . .

## North Dakota

THE PATHOLOGY DEPARTMENT of St. Joseph's Hospital, Minot, is undergoing extensive remodeling and expansion. Dr. Gale R. Richardson is head of the department. Cost of the expansion project is estimated at \$8,000. Among the department's new equipment are a freezing microtome, refrigerator for the blood bank, a sterilizer, microscope, and centrifuge.

THE WILLISTON CLINIC is in the process of erecting a new building at 6th Street East and 5th Avenue East in Williston. The new structure will have office space for 6 physicians, increased laboratory and x-ray facilities, and added conveniences for patients. We regret that in August we published an item concerning this clinic which was incorrect.

DR. W. E. CORNATZER, professor and head of the department of biochemistry at the University of North Dakota, has received a renewal of his grant from the National Institutes of Health. The grant, in the amount of \$5,400, is for his work on phospholipid synthesis in liver disease.

(Continued on page 428)



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3.25%	4.64%	5.24%	6.91%				
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4.25%	6.07%	6.85%	9.04%				
4.50%	6.43%	7.26%	9.57%				
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### NEWS BRIEFS

(Continued from page 425)

Dr. M. E. Belz, who is associated with the Wahpeton Clinic, has received a scholarship for study at the University of London and in Switzerland. The award was given for his work in cancer research.

Drs. Herbert J. Fromm and Francis A. Jacobs have been appointed assistant professors of biochemistry at the University of North Dakota school of medicine. Dr. Fromm formerly held a fellowship in the Office of Naval Research at Loyola University, and Dr. Jacobs was assistant professor of biochemistry at the University of Pittsburgh school of medicine before his appointment.

Dr. John R. Ervin, specialist in general and thoracic surgery, joined the staff of the Northwest Clinic, Minot, in September. Dr. Ervin received his M.D. degree from the University of Cincinnati's college of medicine.

Dr. E. W. Walter, radiologist, has joined the staff of the Quain and Ramstad Clinic, Bismarck. He graduated from Hahnemann Medical College and hospital and recently completed a three year's residency in radiology at the Bismarck Hospital.

DR. JOHN W. DURKIN, JR., is now associated with Drs. Tompkins and Countryman in their clinic at Grafton. A graduate of the University of Vermont college of medicine, Dr. Durkin has had much experience in pediatrics.

### Minnesota

DEDICATION of the Mayo Memorial Building on the University of Minnesota campus will take place October 21 and 22 and the dedication banquet will be held October 21. In addition to state and university officials, a number of distinguished visitors will participate in the ceremonies.

THE NEW HAWLEY MEDICAL CENTER is now in operation. At the open house, held prior to the opening, tours were conducted through the center. Doctors associated with this new center are V. D. Thysell, Arnold Berg, Donald Bentley, and K. W. Blake.

DR. Moses Barron, a professor emeritus of medicine at the University of Minnesota, has been named governor of the American Diabetes Association for Minnesota. He also has been reappointed to the committee on detection and education.

Dr. James R. Fox, of the University of Minnesota health service, is making a survey of medicine in several European countries. Dr. Fox was sent on the trip in cooperation with the American Medical Association to study medical facilities and payment programs in the Scandinavian countries. Findings are to be incorporated in a report.

### South Dakota

THE YANKTON STATE HOSPITAL, in line with trends already established in mental institutions in the East and ahead of those in the Middlewest, has discarded straight jackets, leather belts, and other restraints. It is believed that the freedom gained from such measures will ease much of the tension which hinders the cure of the mentally ill.

DR. WENDELL W. ROBLEY is now associated with Dr. Calvin L. Stewart in the practice of radiology at Presho. Dr. Robley was director of radiotherapy and assistant director of radiology at San Diego Naval Hospital for the past year.

Dr. E. M. Stanisbury, active in medical practice for forty-five years, has announced his retirement. He has been a member of the University of South Dakota medical school teaching staff and an associate member of the medical staff at Sacred Heart Hospital at Yankton.

Dr. Theodore F. Riggs, physician and surgeon at Pierre since 1909, has retired from active practice. After graduating from Johns Hopkins medical school, he formed a partnership with another physician in 1917, known as the Pierre Clinic. Dr. Riggs has also been chief of staff at St. Mary's Hospital.

## Deaths . . .

DR. WILLIS S. LEMON, 76, former chief of the chest medical department of the Mayo Clinic, died August 19. Dr. Lemon received his medical education from the University of Toronto and was associated with the Mayo Clinic for twenty-nine years.

DR. WILLIAM BESSESEN, 74, Minneapolis heart specialist, surgeon, and general practitioner, died August 14. He was assistant in surgery to Dr. William Mayo at Rochester for two years and practiced in Albert Lea, Minnesota for six years before going to Minneapolis.

Dr. Felton Hammond, 73, St. Paul physician and surgeon who specialized in obstetrics and gynecology, died August 10. Death was believed due to a heart attack.

FACIAL INJURIES

(Continued from page 394)

unrecognized because it is masked by accompanying hematoma. If uncorrected, pronounced disability and deformity can result.

4. In severe facial injury, primary consideration is the saving of life. Maintenance of the airway with tracheotomy, if necessary, and restoration of blood volume are first measures.

5. A total assessment of all bodily injuries takes precedence over facial repair. The surgery of repair should be integrated so the number of subsequent procedures will be minimized.

6. In mandibular and maxillary fractures, good occlusion ranks with bony union as essential objectives.

7. For severe derangements, a variety of technics are available for individual application.

- 8. The initial repair should envision the complete skeletal result. Revisions and secondary repairs of the facial skeleton are no substitute for and not as satisfactory as the primary reconstruction.
- 9. Repair of the facial soft parts is secondary in importance and sequence to that of the facial skeleton.



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Parke, Davis & Company announced recently it would replace without charge all Parke-Davis products damaged or destroyed by the recent hurricane and flood tide in retail and wholesale drug firms throughout New England. Graydon L. Walker, vice president and director of U. S. and Canadian sales and promotion, said a survey showed scores of drug stores in the storm area had been damaged in varying degree. Parke-Davis field representatives will aid the druggists to take inventory.

### LAKESIDE ACADEMIC PRIZES ANNOUNCED

The establishment of "Lakeside Academic Prizes" for the Marquette University medical school including an unusual commendation for a laboratory technician, has been announced by Harvey L. Daiell, M.D., scientific director of Lakeside Laboratories, Inc., Milwaukee, Wisc. Three prizes will be given each year. They will be awarded non-competitively, on the basis of academic achievement alone. The three include \$100 to a lower classman, \$100 to an upper classman, and a \$50 prize to a laboratory technician.

"We hope that the prize to the laboratory technician will encourage further recognition of his important role," Dr. Daiell explained. "Through research, the laboratory technician helps the medical school to train better phy-

sicians and to make contributions to medical science."

For 1954, the "Lakeside Academic Prizes" have been presented to three men at the Marquette University medical school. Dr. John S. Hirschboeck, dean, and his committee for outstanding achievements in academic and laboratory activities, made the selections. The recipients were: Peter Kot, sophomore whose excellent record has been made despite a physical disability caused by a polio attack in childhood; Ernest Epstein, senior, who won a prize for his work on a research problem in blood diseases under Dr. Armand Quick; and Eugene Haushalter, laboratory technician, whose impressive work was done in the department of anatomy.

Occasion for the presentations was the Honors Convocation. This year, the Convocation was held in conjunction with the opening of the new wing and the library of the Marquette University school of medicine. The wing has been named for the late Dr. Eben J. Carey, former dean of the school, occasional contributor to The JOURNAL-LANCET.

### RECTALGAN AEROSOL NOW AVAILABLE FOR OFFICE AND HOSPITAL USE

Rectalgan Aerosol (Spray) Dispenser is a new, safe and more efficient liquid topical anesthesia which affords immediate symptomatic relief in surface pain, burns, abrasions, sunburn, etc. It is especially indicated in obstetrics and gynecology—perineal suturing—hemorrhoidal and associated rectal discomforts. The product is supplied in an aerosol spray dispenser and 2 oz. bottle with applicator. Literature is available on request. Mallon Division of Doho Chemical Corp., New York 13, New York, is the manufacturer.



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## Problem of Severe Bleeding from the Upper Part of the Digestive Tract

CARL G. MORLOCK, M.D. Rochester, Minnesota

PERHAPS no clinical event is more dramatic and more apt to alarm the patient and provoke consternation in the onlooker than sudden, obvious loss of blood, such as bleeding from the upper part of the digestive tract. This is particularly true when bleeding continues, its exact source is not apparent, and no simple maneuver arrests the hemorrhage.

In the definition of bleeding from the upper portion of the digestive tract, consideration will be given only to loss of blood arising from lesions located above the duodenojejunal juncture, since hematemesis should be possible if bleeding arises from the upper part of the digestive tract, and hematemesis does not ordinarily occur if bleeding arises in lesions situated beyond the duodenojejunal juncture.

Although a variety of lesions may bleed, the most frequent cause of bleeding from the upper part of the digestive tract is peptic ulcer of the stomach and duodenum. In prior years it was believed that acute hemorrhage from an ulcer never required surgical intervention for its arrest. This view is sometimes held today. Although fortunately spontaneous arrest of even exsanguinating hemorrhage from peptic ulcer of

the stomach or duodenum does occur, death takes too many patients who have this complication and who receive only medical treatment.

### DETERMINING THE SITE OF BLEEDING

Because the modern viewpoint concerning treatment of this problem recognizes a surgical approach as an increasingly important consideration, early and accurate diagnosis of the site and character of the lesion is paramount. If the patient is known to have a duodenal ulcer confirmed by previous roentgenography and if the bleeding is preceded by distress characteristic of the former ulcer distress, the decision may be relatively easy. Unfortunately, in the average case little or nothing is known of the previous history, since the patient is too ill to give an accurate story and the relatives are too distraught to be of aid. Under these circumstances, scant comfort is gained from the reflection that the commonest source of severe bleeding in the upper part of the digestive tract is a peptic ulcer when it is realized that exsanguinating hemorrhage can result from other lesions.

Although formerly roentgenographic examination of patients who were severely bleeding from the upper regions of the digestive tract was delayed as long as two or three weeks after the bleeding had ceased, thus obviously impairing the chance to demonstrate small acute ulcers, many physicians now consider this examination

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to be safe soon after cessation of bleeding or even during the course of acute hemorrhage. Hampton,<sup>1</sup> in 1937, demonstrated a roentgenographic method he considered safe for bleeding patients. He employed this procedure within a few hours after bleeding ceased or, in exceptional cases, while the patient was still bleeding.

My experience has not encouraged me to attempt routine roentgenoscopic examination of patients who are actively bleeding. However, I have learned that a satisfactory roentgenoscopic examination, employing palpation, can be performed safely within a few days after hemorrhage has stopped. I follow this plan for the most part. Certainly the former long period of waiting is unnecessary. This viewpoint also applies to esophagoscopy and gastroscopy. It is illogical to attempt these examinations while the patient is bleeding, but they can be performed safely soon after clinical evidence indicates that bleeding has stopped.

Esophagoscopic examination may yield important evidence of the presence of esophageal varices or ulceration in the sac of a hiatal hernia.

The sulfobromophthalein test of hepatic function, conceded to be one of the most helpful tests for disturbances of the liver in the absence of jaundice, would be expected to afford a real help, since severe damage to the liver usually accompanies portal hypertension and varices. This method can be done easily and quickly, affording a prompt answer when time may be an important consideration. However, this procedure, as is true of any laboratory aid, has its limitations. Severe shock and fever, both frequent accompaniments of gastrointestinal hemorrhage, cause retention of the dye. On the other hand, damage to the liver, with secondary portal hypertension, may be associated with only minor degrees of retention of dye or occasionally even absence of such retention. This is not to suggest that the possibility of help from this test be overlooked but to indicate that only the more pronounced degrees of retention of dye can be accepted as an aid.

### PROGNOSIS OF MASSIVE HEMORRHAGE

Although much has been written about the problem of hemorrhage, the prognosis that accompanies this complication is difficult to establish because of the many variables that attend a given case and because uniform criteria are lacking to define severe or massive bleeding.

Severity of the loss of blood is one of the most important factors in prognosis in any case of hemorrhage. Therefore, it is important to estimate the degree of such loss that has occurred or is continuing to occur. The conclusion that is reached has much to do with the plan of treatment to be employed.

Massive hemorrhage presupposes loss of a large amount of blood. Theoretically, the most accurate and valuable estimate of such a catastrophe would be measurement of the blood volume. However, this desirable end is not easily attained. For practical purposes, appraisal of the clinical status of the patient affords the most useful information. The significant clinical features of massive hemorrhage are collapse, pallor, sweating, air hunger, hypotension, tachycardia, and anemia. A careful follow-up observation of the patient with these factors in mind ensures prompt recognition of any significant change in his course.

Second only to the severity of the loss of blood as a prognostic factor in hemorrhage is that of age. Whereas at ages less than 45 to 50 years the mortality rate is low, being in the neighborhood of 4.3 per cent prior to the age of 40 years, the mortality rate from hemorrhage rises steeply after the age of 50 years to as high as 25 per cent in the eighth decade of life.

The primary hemorrhagic event may be as dangerous to life as any subsequent similar event. Hematemesis, particularly if severe, reflects un-

favorably on the prognosis.

Probably one of the most important prognostic factors is the clinical course during the first forty-eight to seventy-two hours after the initial hemorrhage. If bleeding ceases after the first massive hemorrhage, the prognosis is good. If, on the other hand, evidence of bleeding persists beyond twenty-four hours after admission to the hospital, or if bleeding recurs after apparent stabilization, the prognosis is increasingly poor. Bleeding that occurs while the patient is pursuing a well-supervised therapeutic regimen is an unfavorable prognostic sign, as is also severe pain that precedes the onset of hemorrhage and persists thereafter.

Prolonged and deep shock that is not corrected, and prolonged severe uncorrected anemia and the tissue anoxia that are secondary to these, contribute to a poor result. Any associated disease, whether overt or hidden, particularly if the cardiac, pulmonary, or renal systems are involved, impairs the prognosis. The stress of prolonged uncorrected anemia may precipitate myocardial infarction. Latent renal insufficiency may become manifest in a precipitate increase in the concentration of blood urea.

Finally, since at present operative intervention in bleeding patients is accepted as more and more desirable, it is important to approach advisedly and deliberately the decision to operate. The patient should be in the best possible general condition for this ordeal and a hurried attack, born of desperation, shunned at all costs.

### FEEDING DURING HEMORRHAGE

A factor now considered likely to contribute to an unfavorable result in hemorrhage is prolonged starvation. The older method of treating hemorrhage originating from the upper part of the gastrointestinal tract, and from peptic ulcer in particular, consisted of rest, sedation with morphine, and starvation. Until the beginning of this century, food by mouth was completely interdicted until all bleeding had ceased.

In 1904, Lenhartz<sup>2</sup> challenged the starvation method of treatment and advocated early feeding of small amounts of egg and milk. Although encouraging results followed this regimen, it was soon forgotten. Andresen,3 in 1927, revived this concept, but not until Meulengracht's4 report of 1934 was the medical profession in general made aware of the benefits of earlier feeding in these cases. The reasons given for the validity of early feeding are compelling. It is contended that an ulcer will not heal in a malnourished and anemic patient; early feeding corrects this and also relieves the patient's thirst. Furthermore, food neutralizes the gastric juice and thereby prevents dissolution by acid of any clot that is formed.

Early feeding undoubtedly marks one of the advances of recent years. Although experience has tempered even some of Meulengracht's enthusiasm for vigorous early feeding of patients who are bleeding massively, particularly those who are vomiting blood, I believe that every physician is convinced that early feeding is desirable. Experience has taught the wisdom of caution during the first twenty-four or thirty-six hours of the hemorrhagic episode, particularly if the patient is vomiting blood, but withholding food for three or four days is generally agreed to be fruitless and unwise. If the patient has had a massive hemorrhage, is actively bleeding on admission, and is nauseated and vomiting blood, possibly food should be withheld for twelve hours, but usually no longer than twenty-four hours. Food then can be given and the amounts rapidly increased as tolerated, achieving a liberal regimen within several days. If the patient is not nauseated or vomiting blood on admission, feeding may be started at once.

Many diets have been suggested, each supposed to have a special virtue. Time has tempered enthusiasm, and I believe standard diets for ulcer accomplish as much as any other.

## ROLE OF TRANSFUSION IN GASTROINTESTINAL HEMORRHAGE

It is interesting to note the evolution of thought that has occurred through the years concerning replacement of blood in patients who have severe gastrointestinal bleeding. Not long ago blood was withheld or given in driblets even in exsanguinating gastrointestinal hemorrhage. Objection to transfusion has been based on the idea that by restoring blood volume, blood pressure increases and bleeding is accelerated so that clots cannot form or perhaps a clot already formed becomes dislodged.

Undoubtedly the antipathy toward transfusion noted in past years can be traced in part to the reactions that used to attend administration of blood before modern technics were available. Although no factual basis appears to exist for the fear that transfusion will aggravate gastrointestinal bleeding and dislodge a formed clot, some inherent hazards must be recognized. These are: (1) immediate transfusion reactions, (2) difficulties with regard to Rh antibodies, (3) overloading the circulation, and (4) transmission of homologous serum hepatitis. These hazards should not be troublesome in a well-supervised blood bank where careful crossmatching of blood is done, where donors are rigidly screened, and where administration of blood is supervised by competent personnel.

The most obvious benefit of transfusion is prevention of death from exsanguination. Sometimes bleeding is so massive and protracted that nothing short of continuous administration of blood under pressure can save the patient's life until definitive treatment can be brought to bear on the bleeding vessel. In such instances little question remains about the wisdom of prompt and adequate replacement of blood.

Another important effect of prompt replacement of blood is alleviation of hemorrhagic shock. Abundant clinical and experimental evidence shows that if shock is prolonged and deep, irreversible physiologic changes may occur that will lead to death. These changes may affect such vital functions as are inherent in the myocardium, the kidneys, the liver, and the vasoconstrictor center.

Certainly an extremely important reason for transfusion in these cases is the necessity of maintaining the patient at all times in a satisfactory condition for surgical intervention. The surgical risk to the patient increases immeasurably if any of the vital functions mentioned are allowed to deteriorate.

The blood lost in these cases should be replaced as rapidly as possible. The amount of

blood to be given is gauged by an estimate of the amount lost, as guided by the clinical status of the patient. No set rule can cover every possible contingency, and no inflexible rule can be followed in gauging the speed with which the blood is to be given. If necessary, blood can be infused into more than one extremity at a time. After hemorrhage has ceased and shock has been overcome, transfusion need not be continued until the value for hemoglobin has been restored to normal. However, if available, liberal transfusion speeds the patient's convalescence. Since hemorrhage logically calls for replacement of whole blood, blood substitutes or pooled plasma should not be used except in cases of extreme emergency when whole blood is unavailable. The risk of homologous serum hepatitis after administration of pooled plasma makes its use inexcusable in any center where an adequate supply of blood is available.

MEDICAL ASPECTS OF EMERGENCY SURGICAL
TREATMENT OF MASSIVE HEMORRHAGE FROM THE
UPPER PART OF THE DIGESTIVE TRACT

Despite the best conservative treatment, a minimum of approximately 10 per cent of patients succumb to massive hemorrhage from ulcer. This is too great a mortality rate to permit a complacent attitude toward the efficacy of conservative medical treatment in the care of these patients.

In 1918, Finsterer<sup>5</sup> advocated radical surgical measures in an attempt to save such patients. He operated within twenty-four to forty-eight hours after onset of bleeding and reported a relatively encouraging mortality rate. After an interval of 21 years, he was able to report<sup>6</sup> the excellent mortality rate of 5.1 per cent after early operation in acute profuse gastric hemorrhage due to ulcer. His enthusiasm and results emboldened others, and reports have continued to appear showing the merits of early surgical intervention.

The problem is not simple, for no one contends that all patients who are bleeding from the upper portion of the digestive tract should be submitted to surgical exploration. As already indicated, the most important single criterion affecting the prognosis in hemorrhage is the severity of the bleeding. This factor then becomes a most important yardstick in reaching a decision in regard to surgical intervention. The following classification, modified from Hoerr and associates,<sup>7</sup> offers some guidance in this problem.

1. Moderate hemorrhage. The loss of blood is moderate, totaling perhaps 500 to 1,000 cc. Hematemesis and melena usually occur. Al-

though syncope may accompany the initial hemorrhage, it does not occur again after the patient reaches the hospital. No difficulty is encountered in maintaining a stable circulatory state, and transfusion may or may not be needed. An emergency surgical procedure should not be required in such a case.

2. Severe compensated hemorrhage. Blood is lost at the rate of 1,000 cc. in twenty-four hours, and bleeding usually continues for more than one day. Transfusions are needed and readily maintain a stable circulatory state. Syncope is the rule at the outset of the bleeding but does not recur while the patient is under observation in the hospital. Although emergency surgical treatment may be needed in this group, it usually can be avoided.

3. Severe uncompensated hemorrhage. Loss of blood is brisk, averaging as much as 1,500 cc. in twenty-four hours. Syncope always accompanies the initial hemorrhage and shock is evident on admission to the hospital. Although bleeding continues steadily, adequate transfusion maintains a stable circulatory state. Such a patient must be kept under close supervision. Although surgical treatment may be avoided, it may become necessary at any time.

4. Exsanguinating hemorrhage. Loss of blood is massive from the outset and continues to be profuse. Severe syncope and shock are present initially. Under observation in the hospital, despite administration of blood, repeated episodes of sweating, faintness, and hypotension occur. Massive transfusion at the outset and continued administration of blood at the rate of 500 cc. every eight hours fail to maintain a stable circulatory state. Surgical treatment is compulsory for these patients and this decision should be

reached promptly.

It cannot be emphasized too strongly that if surgical exploration is deemed probable, the decision should not be delayed indefinitely. If the immediate response to transfusion is good, the temptation is to procrastinate concerning a decision to operate. Therefore, there is a subtle danger in continued transfusions, since their very success may lead to ill-judged postponement of an obviously necessary operation.

In the present state of knowledge, I believe that every patient suffering from massive bleeding from the upper part of the digestive tract, particularly if over 45 years of age, should be considered a potential candidate for immediate operation if seen within twenty-four or forty-eight hours after the onset of bleeding. Prognosis becomes increasingly poor if bleeding continues longer than forty-eight hours, and imme-

diate surgical exploration rarely is feasible if bleeding has continued unabated for more than

seventy-two hours.

Although thus far the surgical viewpoint concerning these actively bleeding patients has applied directly to bleeding from peptic ulcer, the same concepts apply to the considerable group of cases in which bleeding must be designated from an undetermined source. A definitive diagnosis of the source of bleeding often cannot be made, even in patients who bleed repeatedly and who are subjected to repeated and careful scrutiny. Sometimes such a patient bleeds massively, yet at the time of emergency exploration no definite lesion can be demonstrated. Under such circumstances, the surgeon may be tempted to close the abdomen as an exploration. However, convincing evidence shows that such patients are protected against the possibility of future hemorrhage by subtotal gastric resection, and such a procedure is recommended.

### PROBLEM OF BLEEDING FROM A VARIX

When acute loss of blood stems from an esophageal or gastric varix, the problems of hemodynamics as related to the immediate care of the patient, the replacement of blood and the giving of fluid, as well as the modern concepts of early feeding, apply equally as well as they do to patients who have bleeding peptic ulcer. Whereas little was done formerly for these unfortunate patients, modern surgical advance continues to offer increasing hope. The care of these patients

can be divided into two stages.

1. Control of bleeding. As in bleeding peptic ulcer, physical and mental rest and relief of anxiety are important. More important is the availability of a method for stopping the loss of blood by direct tamponade. A double balloon, allowing intragastric and intraesophageal tamponade, is usually employed. However, tamponade can be accepted only as an emergency aid in the arrest of acute bleeding because, while it may permanently control the bleeding point, too often release of pressure is followed by further bleeding. The method serves its most useful function as a first step to definitive surgical attack on the bleeding point itself, which leads to the second stage in the care of these patients.

2. Definitive surgical approach to the varix. Intraesophageal obliteration of the varices by injection of sclerosing solutions has been tried without encouraging results. Splenectomy has been done for years, and for years has been recognized as an inadequate method. Recently, a more physiologic approach to the problem, namely, reduction of portal hypertension by

means of either a splenorenal venous or a portacaval shunt, has been employed. Substantial evidence shows that the increased pressure within the portal system plays a major role in the bleeding incident to esophageal varices. Moreover, the different procedures employed for venous shunting definitely reduce this pressure. Other surgical measures, including subtotal gastric resection with concomitant ligation of the larger venous channels, resection of the cardioesophageal region, and devascularization of the lower part of the esophagus, have been recommended. Time is needed to allow adequate assessment of these various procedures.

Obviously all patients who have bleeding from varices are not suitable candidates for these major surgical procedures. If gross hepatic failure is present, the risk of surgical treatment far outweighs any possible benefit that might accrue. Nevertheless, surgical measures do give promise of help in many of what heretofore have been considered hopeless problems. The application of balloon tamponade and definitive surgical measures must be courageous and prompt if the

over-all results are to be improved.

### COMMENT AND SUMMARY

As the problem of severc bleeding from the upper part of the digestive tract is surveyed, difficult though the varying reports in the current literature are to evaluate, it is nonetheless encouraging to note that definite progress is being made in handling these critically ill patients. Three important contributions have been made in modern times: (1) early institution of an active feeding program; (2) early adequate replacement of blood, and (3) early surgical approach.

The results achieved by the emergency surgical treatment of these seriously ill patients have been most encouraging. Crohn and Janowitz,8 in a study of hemorrhage from peptic ulcer made in 1951, reported a compilation of the medical literature of the twelve prior years and found records of 746 cases in which exploration was carried out during the first forty-eight hours after onset of bleeding. The gross average mortality rate in this series was 10.5 per cent, which compares closely with an average mortality rate of 10.7 per cent found in an analysis of 1,822 cases in which massive hemorrhage was treated by conservative medical measures. This is all the more remarkable when one considers that the surgical group undoubtedly included cases in which the patients were seriously ill and the operation was almost an act of desperation.

It must be recognized that remarkable im-

provement in surgical technics, availability of safer anesthetic agents, rapid replacement of blood during and after operation, free use of antibiotics, teamwork, and timing entitle the surgeon to assume great responsibility in salvaging these seriously ill patients who might otherwise die.

A most important factor in improving the outlook for such patients is the development in every hospital of a therapeutic plan for their care. This plan requires three essential components, the first of which is a co-ordinated, integrated, clinical and laboratory team in which the internist, the surgeon, the roentgenologist, the clinical pathologist, and the anesthesiologist assume equal responsibility for the outcome. The first two members of this team, in particular, follow the patient from the time of admission to the hospital and collaborate closely in decisions necessary for his proper care. The second fundamental is a well-equipped blood bank assuring an adequate supply of blood at all times. The third necessity is highly developed operative teamwork, with surgeons and assistants competent to handle the technical difficulties peculiar to these problems.

Prognosis in severe hemorrhage from the upper part of the digestive tract is at all times most difficult. Each case must be considered individually. The final outcome depends on the co-operative judgment and skill of the physi-

cians and surgeons in attendance.

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### DR. HARRY EAGLE TO PRESENT JOURNAL-LANCET LECTURE

The twelfth Journal-Lancet Lecture will be given November 18, 1954 at 8:15 P.M. in the Mayo Memorial Auditorium, University of Minnesota Medical Center. Dr. Harry Eagle will be the speaker, and the subject of his lecture will be "The Mechanism of Action of Penicillin."

Dr. Eagle, a 1927 graduate of Johns Hopkins Medical School, is chief of the section of experimental therapeutics, National Microbiological Institute, National Institutes of Health, United States Public Health Service, Bethesda, Maryland. He has held a research fellowship in the National Research Council and holds a presidential citation of merit for services rendered during World War II. Among the several professional organizations of which he is a member are the Society of American Bacteriologists, American Society for Clinical Investigation, and the Association of American Physicians. While at the University of Minnesota, Dr. Eagle will also participate in a course in Infectious Diseases to be held November 18 to 20 at the Center for Continuation Study.

The JOURNAL-LANCET Lectures have become an annual event since Dr. Réné Dubois delivered the first lecture in 1941 and are responsible for bringing many outstanding speakers to the campus.

All interested physicians are cordially invited to hear Dr. Eagle present

the twelfth JOURNAL-LANCET Lecture.

## Osteopetrosis

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steopetrosis or Albers-Schönberg disease is a relatively rare condition in which the normal bony structure becomes thickened and sclerotic because of an increase in the number and size of the trabeculae and excessive calcarious deposit. Perhaps 200 cases in all have been reported in the literature to date.

The cause of the disease is not known, but there is a definite familial tendency. Consanguinity has been implicated, as would be expected in a familial trait. Many instances are recorded of the disease occurring among several members of the same family. The disease may begin in infancy or childhood, or may not appear until later in life. In the childhood type, the skeletal changes seem to predominate and usually are so progressive and severe that afflicted children do not survive to reach full skeletal development. In the adult type, changes in the blood forming elements with osteosclerotic anemia dominate the clinical picture.

The pathologic changes of osteopetrosis begin in the metaphysis. Endochondral ossification proceeds normally to the point of osteoid opposition on the projecting bars of calcified cartilage matrix. Because of a paucity of osteoblasts, only a thin layer of osteoid is applied. The zone of provisional calcification continues to proliferate, thus producing long, heavy bars of calcified cartilage matrix. Instead of the calcified ground substance absorbing as it normally should, it persists, and the persisting concentration of calcified matrical substance is responsible for the striking roentgenologic characteristics of osteopetrosis. The bone cuts and breaks like chalk, so that many observers feel the name chalk bone is more feasible than "marble bones." The second characteristic of the disease is the narrowing of the medullary canal in involved bones. Thus, dependent on the extent of bone involvement and age of onset of disease process, varying degrees of anemia will be present.

The clinical manifestations of osteopetrosis are

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few and certainly not distinctive. Pain usually is absent and limitation of motion is not pronounced unless extensive involvement is present in the joint areas. Symptoms associated with progressive anemia may make up the clinical picture. The serum calcium and phosphorus and the urine are all within normal limits.

Diagnosis of the disease is dependent on roentgen manifestations. In the early stages, the growing bone in the diaphysial regions begins to show an unusual increase in density. This gives an appearance of dense sclerosis in the metaphysical region, similar to that seen in poisoning from heavy metals. As the disease progresses, the sclerosis does not fade off into normal bone but continues into the shaft. In the later stages, all the bony parts assume a structureless dense appearance. Most of the thickening of the bone takes place by encroachment of the medullary canal. Encroachment of the thick sclerotic bone in the medullary cavity reduces not only the size of the marrow space but also the size of the nutrient canals, thus depleting bone blood supply and resulting in spontaneous infractions wherever the bone is at a strain. These occur particularly at the under side of the femoral neck and the upper ends of tibial condyles. The brittleness of the bone also leads to spontaneous fracture.

The osteosclerosis associated with the disease affects the skull as well and encroachment of the cranial orifices may cause nerve pressure and loss of function. Optic atrophy or deafness may result from the process. Encroachment of the pituitary has also been described and may be a factor in the dwarfism that accompanies this disease.

The case I am reporting is that of a 6-year-old girl, the oldest of 4 children. The general family history is of no particular significance. The patient has a cousin on the paternal side in whom osteopetrosis was found at 9 months of age, with involvement of the cranial bones.

Since this fact implicated a paternal transmission, further studies of the family were indicated. To date the grandparents have refused roentgen studies. The father is one of 10 children, 6 of whom have had normal roentgenogram bone findings. The siblings of the 2 affected children, 6 in all, plus 10 other children have had normal roentgenograms.

This child was first seen at 9 months of age when a mild caput quadrates with mild epiphysial thickening was noted. No x-ray films were taken. The child progressed normally, yet seemed a little slow mentally. The latter part of May, 1953, the child fell while playing. I saw the child one month later, at which time the mother said the child began to limp slightly after the fall and that the limp was becoming more noticeable. At no time did the child complain of any pain or discomfort. After initial roentgen studies, the child was hospitalized at Children's Hospital for further studies. The blood picture, blood calcium, phosphorus and cholesterol, urea nitrogen, nonprotein nitrogen, and urinalysis were all within normal limits. Mantoux and Wassermann were negative. Complete body roentgenograms were taken. The skull is developing normally. The petrous pyramids of the temporal bones show slight increased density and early involvement of the central portion of the sphenoid bone. The clavicle and scapula are involved. The same homogenous density is noted in the upper part of the humerus. The marrow space in the upper humeral metaphysis is nearly obliterated. The entire spine is involved, the cervical vertebrae proportionately less. The most pronounced sclerosis is at the developing end plates of the vertebrae and at the growing ends of the ribs. The process involves the ileum, with the linear striation often noted, giving a Japanese fan appearance. The hip areas (figure 1) show diffuse involvement, especially pronounced around the margins of the acetabula and the neck and head of the femurs. Slipping of the femoral epiphysis is present. In general the process seems to be diffusely generalized, most pronounced in the lower spine, pelvic and hip areas, and decreasing peripherally in the forearms and lower legs. Roentgenograms indicate that considerable bone marrow remains.

The second patient, a boy now 2 years of age, is a first cousin of the girl afflicted with the



Fig. 1. Roentgenogram of pelvis and hips, showing extensive osteosclerosis involving upper femurs, pelvic bones, and the vertebral bodies.

disease. Two other children in the family are well. This child has been under observation and care at the Gillette State Hospital. At 3 months of age he had pneumonia, and chest roentgenograms revealed bony changes indicative of osteopetrosis. He was hospitalized at 9 months of age with a history of inability to sit or crawl and with peculiar staring and shifting of the eyes. On examination, head circumference was 52 cm., with a large anterior fontanel. Mild exophthalmos, chalky mottled teeth, and pallor of the optic disc were present. Roentgenograms showed rather generalized bony involvement with skull involvement and resultant optic nerve compression. About one year ago, decompression of both optic nerves was done. Vision perhaps slightly improved.

No form of therapy has been of value. Occasionally spontaneous remissions may occur. A course of ACTH therapy was given the girl, with no improvement in gait and no roentgenogram changes noted to date. She leads a fairly normal life with no great restriction in activity as yet.

## Ophthalmic Emergencies\*

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In this paper some of the common ophthalmic emergencies, both medical and surgical, are discussed and their treatment outlined. Usually a careful examination by the physician enables a diagnosis to be made, and often proper treatment by the first attendant preserves vision.

### **INJURIES**

1. Conjunctival lacerations. Tears of the conjunctiva usually heal readily. Subconjunctival hemorrhage is alarming in appearance, but readily absorbs. Cleansing and instillation of appropriate local agents to prevent infection is usually sufficient treatment. Preferred solutions for prevention of infection are: (a) sodium sulfacetamide (Sulamyd), 50 per cent solution; (b) Gantrisin, 4 per cent solution; (c) bacitracin solution, 500 units per cc. with ephedrine (Bacidrin). Large conjunctival tears denuding areas of sclera near the limbus should be sutured with 5-0 or 6-0 silk or catgut. In the cul-de-sac, the conjunctiva usually falls together without suturing.

2. Corneal or scleral lacerations. Lacerations of the cornea or anterior sclera are usually obvious. Other signs of serious ocular injury are:
(a) irregularity of the pupil, often accompanied by prolapse of black uveal tissue through the laceration; (b) anterior chamber hemorrhage; (c) vitreous hemorrhage, which obscures the interior of the eye and gives a black reflex when ophthalmoscopy is attempted; (d) iridodialysis or tearing of the root of the iris, which may or may not be accompanied by anterior chamber hemorrhage.

The emcrgency treatment of severe eye injuries should consist of administration of tetanus antitoxin and penicillin and streptomycin parenterally. Local treatment should be confined to applying pads to *both* eyes pending transfer to an ophthalmologist. If this is long delayed, local instillation of 0.5 per cent Terramycin or aureomycin ophthalmic solution could be instigated. The use of ointments is contraindicated when the cornea or sclera are ruptured, because of

the danger of the ointment base entering the eye.

2. Nonperforating injuries (contusions) of the eyeball. These lesions can also cause serious intraocular damage. If the injury is not severe, treatment of these injuries could be carried out at home or at the local hospital. Again anterior chamber hemorrhage, irregularity of the pupil, or black fundus reflex, are signs of a severe injury. As after any injury, the visual acuity of each eye should be tested separately. Treatment consists mainly of rest and pads applied to the eyes. Cycloplegics may be administered except in case of anterior chamber hemorrhage.

3. Injuries to the lens. Perforating or nonperforating injuries to the globe can cause dislocation of the lens. A tremulous iris denotes posterior dislocation. Anterior dislocations, in which the lens is visible in the anterior chamber, eventually causes glaucoma.

Direct injury to the lens always results in opacity of the lens. The cataract may be partial or complete. Sometimes this process takes place in a few days, sometimes over a period of months. The treatment of injuries to the lens lies in the province of the ophthalmologist.

4. Injuries to the retina. Detachment of the retina may result from a blow, especially in a myopic eye. A patient with a detached retina usually complains of a "curtain" coming down over his visual field. Sometimes he reports improvement with rest. The treatment of retinal detachment is surgical. Commotio retinae. After a blow the retina may show edema of the macula, a grayish-white appearance of the macular area with a red foveal spot. Vision is disturbed, but returns. Treatment is bed rest, with eyes occluded, and administration of cycloplegics.

5. Hyphema. Blood in the anterior chamber is often considered an inconsequential occurrence. However, recent reports<sup>1,2</sup> show that poor vision is the result in as many as 40 per cent of these cases. Recurrent hemorrhages are frequent. Secondary glaucoma and a blood stained cornea are two complications which cause loss of vision

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<sup>\*</sup>Presented to the summer meeting of the Park Region District Medical Society at Dunnvilla, Minnesota, July 7, 1953.

Neither mydriatics nor miotics should be given. The patient should be transported to the hospital with the head elevated so that the blood settles to the lower anterior chamber. Both eyes should be occluded. The ophthalmologist may have to consider paracentesis and irrigation of the anterior chamber if it is full of clotted blood.

6. Sympathetic ophthalmia. This dread complication occurs in about 4 per cent of penetrating eye injuries.<sup>3</sup> Best treatment is prevention by adequate repair of wounds, minimum trauma during treatment, and administration of foreign protein. ACTH and cortisone probably reduce the incidence of this disease.<sup>4</sup> Of the cases of sympathetic ophthalmia, 65 per cent occur after penetrating injuries, 25 per cent after surgical procedures, and the remaining 10 per cent after other trauma including nonpenetrating injuries.<sup>5</sup>

### FOREIGN BODIES

Corneal foreign bodies are usually revealed by careful examination with good illumination. They can be removed with a spud, but a hypodermic needle on a syringe is a very good substitute. Careful inspection for, and removal of a rust ring is very important. If rust is left in the cornea, it causes a painful eye for a prolonged period of time. Sterility is essential. Anesthesia is readily obtained with ½ per cent solution of Pontocaine. One of the previously mentioned antibiotic solutions should be given postoperatively until the cornea is healed. Ointments may slow epithelial regeneration slightly, but are convenient. A 2 per cent solution of homatropine relieves much of the pain and photophobia of the eye, but care must be taken to rule out glaucoma. This may be done by palpating the eye with the two forefingers and withholding the homatropine if the eyeball is not definitely soft. The eye should be padded using elastoplast, as the pressure promotes prompt healing.

If no foreign body is found on inspection, the eye should be searched for an abrasion. A 2 per cent solution of fluorescein with 1:2500 Metaphen stains any abrasion bright green. This solution should also be used to follow the healing of the cornea after removing a foreign body and after corneal ulcerations.

Intraocular foreign bodies should never be overlooked as a possibility even though the eye may be white and comfortable. A careful search, and possibly a roentgenogram are indicated whenever anything resembling a corneal or scleral wound is seen. After the eye has been struck by a flying object, a linear staining area is particularly suspicious.

The pupil may be dilated with a solution of 1 per cent Paredrine hydrobromide or 10 per cent Neosynephrine, but not with atropine. Ordinary anteroposterior and lateral films of the orbital region show the presence or absence of a foreign body, leaving more complicated localizations to be carried out in cooperation with the ophthalmologist. If an intraocular foreign body is present, both eyes should be padded. An ice bag placed on the eye for one-half hour and removed for one-half hour may reduce lid edema. If possible, the exact composition of the substance should be determined, particularly whether or not it is magnetic.

Intraocular foreign bodies carry a poor prognosis even when well and promptly treated. A recent series reported only 25 per cent of such eyes with 20/70 or better vision, 55 per cent with blind or enucleated eyes.<sup>6</sup>

### BURNS OF THE EYE

Thermal burns are rare. The blink reflex is so quick that often the face and lids may be severely burned, but the eyes remain unharmed.

Chemical burns should receive first-aid treatment immediately, which consists of simply flushing the eye with large amounts of water. No attempt at neutralization should be made.<sup>7</sup> Alkalies are more damaging than acids. Treatment is directed toward relief of pain by instilling local anesthetics and a 2 per cent solution of homatropine three times a day, 5 per cent in children; and toward promotion of epithelization by padding the eyes and preventing infection. Ointments and local anesthetics both inhibit epithelization, but some consideration must be given to comfort.

It is becoming apparent that cortisone reduces corneal scarring, and it may be given locally, as drops or ointment, after epithelization is well under way.

Actinic burns by ultraviolet light cause tiny erosions of the cornea which may be very painful. The diagnosis is usually made from the history. There is a summation from exposure within twenty-four hours, and a latent period of eight hours before symptoms occur. Local anesthetics and padding or sleep give relief.

### SUDDEN LOSS OF SIGHT

The following conditions should be considered in the differential diagnosis of sudden loss of sight as an isolated symptom without ocular pain. In most cases a provisional diagnosis can be made from the ophthalmoscopic appearance. *Unilateral* 

1. Occlusion of the central retinal artery. The

retinal arteries are bloodless and extremely narrowed. No arterial or venous pulse is visible. The blood column in the veins is segmented. Within a few hours the retina becomes gravish white with edema, at which time the macular area stands out as a cherry-red spot. There are few or no hemorrhages. Since an occlusion may be incomplete with a spastic component, attempts at vasodilation are of value. Vigorous massage of the eyeball may be instigated immediately. Amyl nitrite by inhalation, nitroglycerine sublingually, or papaverine intravenously may be administered. Anterior chamber paracentesis and cervical sympathetic block

are specialist procedures of value.

2. Thrombosis of a retinal vein. In this condition, the involved retinal veins are greatly enlarged and tortuous. Many large areas of hemorrhages and exudate are present. Often only one branch is involved, which is usually the superior temporal branch. In this case, loss of vision corresponds to the area involved, and reading vision is lost only if the blood supply to the macula is embarrassed. A high percentage of eyes with an occlusion of the central retinal vein develop an absolute glaucoma approximately one hundred days later. Permanent retinal damage is not immediate in venous occlusion, and in some cases recanalization and formation of collateral circulation result in improved vision several days or weeks after the thrombosis.

Anticoagulant therapy has been tried in an effort to reduce the incidence of secondary glaucoma, and to facilitate the formation of collateral circulation and improvement of retinal function. Dicumarol in sufficient dosage to depress the prothrombin time to 30 per cent for four to six weeks has been the usual routine. However, the final visual results have not been appreciably better than in untreated cases.8,9

3. Spasm of a macular arteriole. Such a condition causes a temporary partial loss of vision. Usually the fundus appears normal, but sometimes focal spasms or a generalized arteriolar narrowing are seen. Treatment with vasodilators may prevent recurrence; 50 mg. of nicotinic acid three times a day before meals is the drug usually given.

4. Hemorrhage at the macula. This condition always occurs secondary to a general retinopathy, such as that of diabetes, hypertension, or arteriosclerosis. Treatment is that of the general condition.

5. Optic neuritis. An inflammatory process of the optic nerve almost always cuts off the macular vision very early in its course and quite suddenly. An inflammatory process of the disc causes a papilledema. With a retrobulbar neuritis, the fundus usually appears normal until late in the disease when optic atrophy may appear. Retrobulbar neuritis is usually associated with multiple sclerosis. Foreign protein therapy is the time-honored treatment. Good results are being reported with ACTH and cortisonc. Bilateral

The toxic optic neuritides caused by methyl alcohol, quininc, or uremia are the most frequent causes of bilateral sudden blindness. Optic neuritis caused by tobacco and/or ethyl alcohol is slower in onset and progression, but is sometimes reported by the patient to have been sudden.

Most of the conditions discussed in the etiology of unilateral sudden blindness can rarely be bilateral.

Hysteria should be considered in the differential diagnosis of bilateral sudden blindness.

### ACUTE OCULAR PAIN

The following conditions should be considered in the differential diagnosis of an acutely painful red eye.

1. Acute iritis causes pain that is moderate and deep, like a headache or a toothache. The redness is circumcorneal, but is general if a conjunctivitis is also present, as is often the case. The pupil is small and irregular. The onset is likely to have been gradual.

Treatment consists of instillation of cycloplegics, 1 per cent solution of atropine three times a day and 2½ per cent solution of cortisone or 1 per cent ointment every hour. Specialist opinion may be necessary to differentiate this condition from glaucoma.

2. Acute glaucoma can be secondary to acute iritis. In acute primary glaucoma, the pain is usually severe and prostrating, extending over the whole fifth nerve region. The pupil is usually scmidilated and fixed. The cornea is steamy. The eye feels hard. In both glaucoma and iritis, the eye is red and tender to the touch. A previous history of attacks of blurred vision and halos around lights, associated with slight redness and pain in the eye suggest glaucoma and may be helpful, if elicited.

Treatment is miosis with a 1 or 2 per cent solution of pilocarpine every two hours. Morphine may be necessary for pain.

3. Keratitis or corneal ulceration should be suspected as a possible cause of a painful red eye. Keratitis may be due to syphilis, tuberculosis, herpes febrilis, or trauma. In treating a corneal inflammation or ulcer, relief of pain and photophobia are obtained by instilling a 5 per

cent solution of homatropine and bandaging the eye. Some types of keratitis have responded successfully to cortisone applied locally, but the effect is uncertain, and some authorities feel the drug may be contraindicated in the dendritic keratitis of herpes febrilis.

4. Spastic entropion in the elderly, a condition in which the lower eyelashes roll inward and scratch the cornea if the eyelids are forcibly closed, causes a painful eye. Treatment is surgical. A Ziegler puncture, a minor office procedure, is often effective; if not, a plastic procedure to the lower eyelid is necessary.

5. Trigeminal neuralgia should also be considered in the differential diagnosis of a painful red eye. It may cause pain referred to the eye, although it is usually more widely distributed.

6. Herpes zoster ophthalmicus is a condition in which the skin outbreak is preceded by a constant burning pain in the eye. Herpes zoster ophthalmicus is frequently complicated by iritis, glaucoma, and keratitis.

### SUMMARY

Ophthalmic emergencies encountered in general practice fall into three groups: injuries to the eye, sudden loss of vision, and painful red eye. The separate entities which must be considered in the differential diagnosis of these conditions have been discussed, and treatment outlined.

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HYALURONIDASE, when injected around the affected area, is effective treatment for such soft-tissue injuries as hematoma, hemarthrosis, and edema of traumatic origin. When the enzyme is used promptly in adequate dosage, John J. Gartland, M.D., of Jefferson Hospital, Philadelphia, and William R. MacAusland, Jr., M.D., of the Columbia University-Presbyterian Medical Center, New York City, find that impending Volkmann's ischemic contracture may be prevented without surgical procedure. The substance is the only efficacious agent against extravasations of blood in hemophilia. The dispersing action in acute arthrosis is not attended by bleeding. The medicament may forestall the development of myositis ossificans. Usually 1,500 turbidity-reducing units of the powdered enzyme are dissolved in 3 or 5 cc. of 1 per cent procaine solution for use; each cubic centimeter of solution thus contains 300 or 500 turbidity-reducing units. No sensitivity reactions or toxic manifestations are attributable to the

JOHN J. GARTLAND and WILLIAM R. MACAUSLAND, JR.: Arch. Surg. 68:305-314, 1954.

# Effective Antitussive Agent in the Treatment of Cough in Childhood

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In order to treat the coughing child effectively, the cause must be determined and then a cough preparation prescribed which is not only of rational therapeutic value, but both palatable and appealing to the young patient. In 1926, Bernard Fantus¹ placed considerable emphasis on the fact that medicine should not only appeal to the taste, but also to the eye; yet these important factors are still frequently overlooked.

While attempting to find the cause of a child's cough, the best procedure is to start at the upper part of the respiratory tract and proceed downward in the following anatomic sequence.

1. Inflammation of the nose and nasopharynx may result in acute rhinitis or catarrh with postnasal drip and resulting cough. The latter is quite prevalent along the Atlantic seaboard and can be very annoying. Enlarged adenoids sometimes cause cough, as do foreign bodies in the nose and nasopharynx. Middle-ear infection or cerumen in the external canal pressing on the ear drum may be responsible for reflex coughs which are often difficult to diagnose. Disease of the paranasal sinuses, or even an elongated uvula may likewise cause trouble.

2. Coughs of pharyngeal origin occur frequently. A child seldom complains of a sore throat, but acute inflammatory conditions of the tonsils may appear with a cough as the predominant symptom. An early diagnosis is important, since antibiotic or sulfonamide therapy may be indicated to avoid serious complications. Fortunately, diphtheria is rapidly being eliminated, but cough from a diphtheritic membrane could suddenly become fatal if overlooked.

3. Coughs of laryngeal origin are common and ordinarily result from three conditions. The most frequent is the so-called croup, and, in the majority of cases, responds quite readily to

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treatment which will be discussed later. This type of cough occurs suddenly and usually in the middle of the night when the child's bedroom becomes overventilated with cold night air. Occasionally, but fortunately much less frequently, a very fulminating, virulent form of croup may occur, causing a great deal of dyspnea, cyanosis, and edema of the glottis. An emergency trachcotomy may be imperative to avoid a fatal outcome. Therefore, all croup cases must be taken seriously and treated with utmost respect. A croupy cough frequently precedes the rash in measles, probably due to Koplik's spots on the laryngeal mucosa.2 The other two conditions causing a croupy cough, but much less common, are: retropharyngeal abscess, which causes edema of the larynx, and the croup of laryngeal diphtheria, so common and often fatal twenty-five to thirty-five years ago.

4. Coughs of tracheal origin, such as tracheitis, result in a hoarse, painful, nonproductive
cough, frequently accompanied by substernal
discomfort. Stridor and a loud, brassy type of
cough in a baby may be the result of an enlarged thymus causing tracheal pressure. Enlarged mediastinal glands in older children may
give rise to a spasmodic, hoarse, hacking cough
that can be very annoying. Roentgen study is

indicated in all coughs with stridor.

5. Coughs of bronchial origin, such as the so-called common cold frequently spread downward from the nasopharynx to the trachea and then into the bronchi and bronchioles. When the large tubes are involved, rhonchi are found and then rales in the smaller bronchial tubes. If the rales get finer, dry, and crepitant, the possibility that pneumonia may develop presents an added complication. If the origin of the cough has been accurately localized, the question of treatment becomes relatively simple. Obviously, since the primary object of a cough is to remove a foreign body from the respiratory tract, the cough should be encouraged if this might be achieved and otherwise discouraged.3 In other words, measures should be taken to stop almost all coughs originating above the bifurcation of the trachca. But, when the cough apparently originates below the tracheal bifurcation, the picture is entirely different. Coughing, then, is not necessarily a disadvantage and should not always be arbitrarily suppressed. This applies particularly to the so-called productive cough, which is a compensating process of nature for removing secretions that otherwise accumulate and aggravate the condition. Whooping cough is a good example of this type.

### IMPORTANCE OF RESPIRATORY TRACT FLUID

More than 400 years ago, Villanovanus<sup>4</sup> recommended syrup as a vehicle for cough expectorants. We find, however, that as late as 1930 many medical textbooks gave a confused and often discouraging account of the therapeutic use of expectorants. Alan Moncrieff<sup>2</sup> in 1933 felt that, "expectorants have a very limited use." Shoemaker<sup>5</sup> feels that a continuous secretion of mucus is necessary to keep the air passages moist. Boyd<sup>6</sup> states that, "the stimulus giving rise to cough may originate through irritation lower in the respiratory tract, in areas of the trachea, bronchi, and bronchioles not reached by demulcent saliva." A troche, lozenge, or cough drop, stimulating the flow of saliva while held in the mouth, takes care of many of the milder coughs, but it is the persistent, deep-seated bronchial cough that is apt to cause greatest concern and in which our interest centers. Boyd and Ronan,7 in 1941, in experimenting with cats anesthetized with ethyl carbonate, found respiratory tract fluid a valuable means for the comparative evaluation of expectorants. When we consider the part played by the cilia lining the respiratory tract in their upward motion, and the peristaltic movements of the muscles of the smaller bronchi trying to expel mucous plugs and other irritants, we realize the importance of the respiratory tract fluid as an indispensable aid to the cough itself in expelling tenacious mucus. This fact applies particularly to cases of pertussis.

Ordinarily, the mechanical forces of coughing are sufficient to cause the evacuation and removal of inflammatory exudates or foreign bodies from the respiratory tract, but the cough becomes much more useful and efficient if the fact is kept in mind that the respiratory tract fluid should be increased sufficiently to accomplish its purpose. However, in a number of instances, the cough is unproductive or the coughing effort fails to raise the tenacious, sticky mucus lining the walls of the respiratory tract. This type of cough is usually referred to as useless or unproductive. Banyais describes this tussal insufficiency clearly when he states "A frequent

source of inadequate cough is any disease of the lung in which the mucoid or mucopurulent products of inflammation are so tenacious, sticky, and adherent to the walls of the respiratory passages that even intense, exhaustive coughing is unable to remove them. The prototype of inadequate cough of this sort is that seen in the paroxysmal stage of whooping cough."

The dangers that may result from tussal insufficiency are readily appreciated. Mucus and purulent exudate are retained. The bronchi and bronchioles become stagnated with products of inflammation. Complete obstruction of air passages and alveoli may result and cause, in some cases, atelectasis. Exudates, instead of being carried away, might readily coagulate with a tendency to cause fibrosis and even lead to bronchiectasis.

Tussal insufficiency can be treated symptomatically by cough sedatives when there is no material in the lower air passages requiring removal. This lack of material in the lower air passage does not occur as often in children with well-balanced body fluids. Therefore, instead of depressing the respiratory center of the cough reflex with sedatives, a more valuable procedure would be to add some ingredient to the treatment of the cough that would tend to maintain the smooth muscle of the respiratory tract in a state of normal tone. This would reduce the possibility of spasm contributing to cough. Also, with normal muscular tone, freer passage of air to and from the lungs, as well as freer upward passage of secretions, is possible. A sympathomimetic amine, such as desoxyephedrine, relaxes the spasm of the bronchial musculature and improves the smooth muscle tone of the respiratory tract. It also improves mood and relieves the sense of fatigue and frequently counteracts many of the symptoms of the common cold. The role these pressor amines play in increasing pulmonary circulation and ventilation should not be overlooked.

### THERAPY OF COUGH

Fantus<sup>9</sup> classifies coughs into three categories: "Tight, loose, and insufficient." Many of the coughs in children are in the tight or loose category, but the treatment for all three types of coughs is much the same. As mentioned before, syrups<sup>4</sup> have been used for centuries as cough preparations. The experimental and clinical results of Boyd<sup>10</sup> indicate that this use is rational, for he found a distinct increase in the respiratory tract fluid in experimental cats and rabbits. The relationship between the respiratory tract fluid and antitussive expectorant action is set forth by

Boyd and Pearson<sup>11</sup> as follows: "Since respiratory tract fluid may be considered as part of its function to act as a lubricant toward the lining mucosa of the respiratory passages, it seems logical to conclude that expectorants by increasing production and excretion of respiratory tract fluid exert a soothing or demulcent action upon the mucosal lining and in this manner relieve coughs which are due to irritation of the mucosa lining the respiratory passages."

Until very recently the most valuable treatment for the tight croupy cough was syrup of ipecac given in doses of 1 to 2 tsp. so that emesis occurred in twenty minutes to one-half hour, forcing the thick, tenacious mucus out of the bronchial tubes. It often gave quick, but not always lasting, relief. In the last few years expectorants containing antihistamines have

been used with varying results.

The value of glyceryl guaiacolate has been known for some time as an antitussive agent. It has been particularly valuable in treatment of the dry, nonproductive cough because its action increases the respiratory tract fluid. Cough medicines containing sedatives appear to be effective, but when the sedative loses its effect, congestion often persists and the cough reappears. Glyceryl guaiacolate helps remove the cause of the cough instead of smothering it temporarily.

Cass and Frederik<sup>12</sup> conducted a general survey of agents commonly employed in combating cough and reported that Robitussin, which contains glyceryl guaiacolate as well as desoxyephedrine, gave superior results and seemed to follow the criteria laid down by Fantus<sup>9</sup> in 1926.

### SCOPE OF PRESENT STUDY

A careful study has been made during the past winter months of a series of 76 infants and children with various types of upper respiratory infections. Of these, 40 were ambulatory office patients and 36 were hospitalized during the period of observation and treatment. Of the series of 40 ambulatory office patients studied and carefully followed during the early part of the past winter, 30 showed varying degrees of bronchitis, ranging from stages of subacute to chronic. However, the majority, 20, had acute bronchitis, while 9 had subacute and 1 had a definite case of chronic bronchitis. Signs of varying degrees of croup appeared in 8 patients, while 2 had rhinitis and were coughing from a postnasal drip; but the infection had not extended any further downward in the respiratory tract. At the time of their first office visit, 22 of the patients were without fever, while the others had fever varying from 100.5 to 103°. Ages ranged from 2 months to 16½ years; 30 were under 6 years of age

under 6 years of age.

Robitussin was the drug employed in this study. Dosage varied from 5 drops every four hours for a 2-month-old infant to 1 tsp. every four hours for children 5 years of age or older. No ill effects occurred except vomiting in the case of a 4-month-old infant who was given 12 minims every four hours. This may have been due to the mucus raised in coughing, but vomiting ceased when the dosage was reduced to 8 minims every four hours. The length of treatment varied from five to ten days with excellent results. Sulfadiazine syrups were used in addition to the expectorant in 4 cases, and penicillin was administered intramuscularly in 13 cases.

In the majority of cases, mothers reported excellent results in six to eight days, and on further examinations in the office, the lack of rales and cough verified their reports. In order to make a more extensive study of this antitussive agent and its effect in the treatment of the child with cough, a series of hospitalized patients were studied while under the constant observation of physicians and nurses. The hospitalized patients were all seen and observed at the Essex County Isolation Hospital, Belleville, New Jersey. The 36 patients in this series were all children, most of whom were under 5 years of age. Of these, 21 had pertussis. The remaining 15 had various types of upper respiratory infections. Some were primary upper respiratory infections, and others were complications of some other disease. All patients, regardless of age or degree of cough, were given 1 tsp. of the agent four times daily and every four hours at night, if necessary. The severity of the cough was the reason for hospitalization in the majority of the cases.

### RESULTS

None of the 36 hospital patients refused to take Robitussin. Most of the children liked the taste, and no disagreeable side effects such as nausea, vomiting, or loss of appetite were observed.

In the 21 cases of pertussis observed, the severity and frequency of the paroxysms were markedly reduced. As a result of this, the vomiting of food was greatly diminished, and sleep was not interrupted as frequently. As far as could be ascertained from the histories obtained from the mothers, none of these patients had received pertussis immunization.

In the 15 other hospital cases, the diagnosis ranged from primary upper respiratory infection to various communicable diseases with a complicating upper respiratory infection. There also

was 1 case of lobar pneumonia and 1 case of larvngotracheitis. In all of these patients, the cough was improved in three to seven days and, in most cases, was absent in four to eight days. These patients were watched carefully and cough medication given at regular four-hour intervals during the day and every four hours at night, if necessary. Sulfonamides and antibiotics were given, if indicated, in addition to the cough remedy.

Prior to the use of this expectorant at the Isolation Hospital in Belleville, New Jersey, preparations containing codeine were frequently used. These preparations were found to be very unsatisfactory in actually reducing the intensity of the distressing whooping cough spasms and shortening the number of days in which the scvere cough was a dominant factor. If the dosage of the cough preparations containing codeine was increased in the severe cases of whooping cough, the patient became more lethargic, lost interest in taking nourishment and, in many cases, became nauseated or showed other signs of gastrointestinal disturbances because of overmedication.

In comparing the results in the use of Robitussin in the treatment of whooping cough with previous methods of treatment, the severity and

number of cough spasms have been reduced at least 50 per cent, and the duration definitely shortened. Because of quarantine laws, the length of time in the hospital is not reduced, but the general condition of the patient on discharge is far better than the condition of those given preparations containing codeine or those receiving no cough medication at all. When the number of whooping spasms are reduced or eliminated and vomiting is diminished or eliminated entirely, the child becomes more interested in food and begins to gain weight. The fear of vomiting has a bad psychologic effect on many children and, even though hungry, they often refuse food.

#### **CONCLUSIONS**

Robitussin was found to be a very effective preparation in the treatment of cough in childhood. This efficacy can be attributed to its expectorant, demulcent, and general antitussive qualities resulting from an increased respiratory tract fluid. No previous medication was of any real value in treating pertussis.

Robitussin used in this study was supplied through the courtesy of William R. Bond, M.D., director of clinical research, A. H. Robins Company, Inc., Richmond, Vir-

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# A New Apparatus for Continuous Aerosol Therapy\*

MAURICE S. SEGAL, M.D., AND ALEXANDER SALOMON, M.D. Boston, Massachusetts

Continuous aerosol therapy with a variety of therapeutic aerosols has been found most useful for a large number of clinical disorders in which the common denominator is involvement of the laryngotracheobronchial tree.

The following types of continuous therapeutic aerosols are most frequently employed: (1) high humidification aerosols (cold water vapor), (2) detergent aerosols (Alevaire and so forth), and (3) antibiotic aerosols (penicillin and streptomycin).

The therapeutic objectives vary with the above aerosols and include respectively: (1) lessening of tracheobronchial irritation, (2) ease in evacuating tenacious tracheobronchial secretions, and (3) control of bronchial infection.

The Neb(EL)izer Unit was designed to supply a continuous fine flow of the desired therapeutic aerosols with oxygen or air flows (figure 1). The therapeutic mists can be delivered directly into face tents, face masks, oxygen tents, croup units, tracheotomy openings, or into any type of apparatus supplying oxygen mixtures to the lungs. The apparatus consists of two integral parts: (1) the top nebulizing unit which screws onto (2) a bottom reservoir bottle. A special adaptor, with two metal nipple openings, is attached directly to the inlet of the internal nebulizing chamber. The openings connect with standard rubber tubing respectively to the ice compartment of the oxygen tent and to the oxygen regulator or air-pump units.

Flows of 12 liters of oxygen per minute ensure equal flows of 6 liters to the nebulizing chamber and to the oxygen tent. When used with a refrigeration-type oxygen tent, the connection for the ice compartment is attached to the oxygen inlet. When employed as a home croup unit

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Fig. 1. Neb(EL)izer Unit for continuous therapeutic aerosols.

with simple head canopy or plastic face tent attachment, the oxygen nipple feed is closed off with its screw cap.

The top unit consists of an exterior plastic chamber with carburetor opening for auxiliary air flows. This chamber houses the internal nebulizing unit which employs multiple air jet scoops to ensure the even delivery of a continuous fog of water vapor, Alevaire, or other therapeutic aerosol through the mouth orifice. The internal chamber is attached to an elongated vertical feed rod which rests in the reservoir bottle. The latter is marked for quantitative readings up to 500 cc. The larger sized particles, with water, and foamy material, with Alevaire, fall back through an opening in the bottom of the internal chamber directly into the reservoir bottle.

The entire unit is virtually indestructible. It is easily disassembled for cleansing. It can be employed with all types of oxygen tent units in a variety of ways. It can be hung onto the edge of the tent unit with a short piece of side tubal connection to a grommeted opening into the tent, suspended in a similar fashion to a clysis stand, placed on a bedside table or inside the

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tent. A plastic pocket is available for almost any positioning to the tent. The connection from the mouth orifice to the tent unit should not be narrower than its diameter. The mouth orifice can also be connected by long corrugated tubing to an adaptor which fits into trachcotomy openings.

In our studies we employed the unit with the infant or adult Permatents (figure 2). When Alevaire was used, the apparatus was placed directly into the front grommeted opening and supported firmly in place by its plastic pocket. With cold water vapor aerosols, the unit was placed in its pocket on the side of the Permatent and connected by wide corrugated tubing to the front grommet. In this way, larger water particles could not escape. The ice-containing compartments were filled with ice. Standard rubber tubing connected the ice compartment and the oxygen regulator to their attachments with the Neb(EL)izer. Oxygen flows of 12 liters per minute thus ensured 6 liter flows of oxygen through the unit for continuous aerosol formation.

Water from the reservoir bottle produced a fine moist fog in a very short time. Large water particles did not drip onto the patient or onto the mucosa of the nose or oropharynx. The temperature within the tent dropped to 70°, usually within thirty minutes. The relative humidity reached 85 per cent within twenty minutes and over 90 per cent in one hour. Oxygen concentrations averaging 50 per cent and carbon dioxide accumulations generally below 1 per cent were usually obtained. Both infant and adult patients remained comfortable during the tests and during therapeutic application. The duration of therapy with continuous or interrupted cold water vapor therapy depends essentially on the primary etiology. Therapy continued over a period of one to seven days has proved of value in adults as well as children.

When Alevaire is used, we generally advise 100 per cent concentrations with alternating cold water vapor therapy – 500 cc. of each. This has proved particularly effective in the croup problems seen in infants, small children, and adults. A total of 500 cc. generally requires eight hours, using 12 liters per minute oxygen flows. We



Fig. 2. Neb(EL)izer-Permatent croup unit.

have not observed any toxic effects from Alevaire or cold water humidification therapy. With Alevaire it is important to keep the apparatus, particularly the plastic tent canopies, cleaned daily to prevent clouding.

The unit may also be employed for continuous antibiotic aerosol therapy. Penicillin or streptomycin, alone or combined in a vehicle of distilled water or Alevaire, is placed in the plastic reservoir bottle. To each 500 cc. diluent may be added 1,000,000 units penicillin, or 1.0 gm. streptomycin, alone or combined.

### SUMMARY

The Neb(EL)izer Unit, a simple, inexpensive new unit for the production of continuous, fine, therapeutic aerosols, has been described. The apparatus is universally adaptable to all types of equipment designed to deliver oxygen mixtures. Stable mists of fine aerosols, cold water vapor humidification with saturations above 90 per cent, Alevaire aerosols, or antibiotic aerosols can be administered into face tents or masks or enclosing hoods or canopies, without the danger of water particles falling onto the patient or unit. By combining the unit with the infant or adult Permatent, a complete "croup unit" is available, which requires only a single oxygen tank and regulator to ensure continuous delivery of the therapcutic aerosols, control of the temperature below 70° in the tents, and high humidification water vapor therapy when desired.

The Neb(EL)izer Unit and the Eliot Croup Unit are manufactured by Eliot Medical Plastics, Inc., Lynn, Mass.

# How to Establish an Industrial Health Program\*

T. A. DUCKWORTH

Wausau, Wisconsin

In coming here today to talk about the installation of industrial health programs, I have one advantage over most of the speakers. No one has made the mistake of calling me an expert in this field. What I have to say is based upon interviews with people who do know what they are talking about. These people have seen hundreds of industrial health programs in operation and have helped many companies install them

So much has been accomplished in this field that we are now at the stage in which the big interest is to fill in the gaps, and to find out where improvements can be made. I have asked industrial physicians and nurses of long experience where industrial health programs could be improved the most. They have had the benefit of wide experience in their field from coast to coast in the last twenty-five years and have seen health programs grow in numbers and importance.

Lowering the number of industrial accidents and occupational disease cases belongs among the very real and very serious problems of modern times. That's true whether seen through the eyes of the individual worker, the eyes of the company management responsible for production and profits, the eyes of enlightened humanitarians, or the eyes of the government and the people at large.

Disraeli, in a quotation I pull out of my file every once in a while, said, "The health of the people is really the foundation on which all their hopes and all their powers as a state depends." That quotation could be paraphrased by saying with equal truth that "The health of the workers is really the foundation on which all their hopes and all their usefulness in industry depends."

That being said, how are we doing in the industrial health programs of America? What was I told by these physicians and nurses?

The first thing that was mentioned was the fact that altogether too many industrial health

grams. Some of the biggest and most health-conscious companies in America omit the roent-genogram. I wondered why. Since x-ray films have become a standard part of so many programs, it seemed strange that this should be mentioned as the greatest remaining gap. Not only tuberculosis, but carcinoma of the lung, enlarged heart, and other ailments may be revealed through chest x-ray films.

The dwindling tuberculosis death rate may

programs do not provide for chest roentgeno-

The dwindling tuberculosis death rate may be responsible for this lack. I am afraid, however, that the real reason lies in the fact that a chest x-ray program in a large company may add several thousand dollars to the cost and that this cost is not fully appreciated as being worth while. An industrial health program has, in addition to the discovery of illnesses and disabilities, the purpose of aiding in the proper placement of workers. As a personnel director, I would like to put in a word, too, for the confidence employees gain by knowledge that their fellow workers are healthy and free of contagious diseases. That benefit alone, which affects the employer, should warrant the x-ray program.

When I asked about the next most often omitted part of the industrial health program, I learned that serologies are often not included in physical examinations. This fact was more understandable. To too many people, a blood test is given for only one reason. Letting old prejudices lie may be advisable in some cases. Yet, when it's considered that health examination programs themselves have had to overcome some misconceptions, it seems reasonable to hope that education and explanations can to some degree be effective in improving acceptance of the blood test as a routine part of any industrial health program just as they are in any private personal examination. Certainly efforts should be made to diminish the objections and to have blood tests made wherever they are acceptable.

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<sup>\*</sup>Paper presented at the Mississippi Valley Conference on Tuberculosis, Minneapolis, October 16, 1953.

The next thing mentioned was the need for a follow-up system. Unbelievably, some large companies simply file their health examination reports away and never look at them. In one major company, the company nurse was not even acquainted with their existence. When she learned about them, she found that she had no access to them. The health examination in this instance is nothing more than a snapshot of the individual taken at a given instant. Any health program worth having is continuous. The program should follow up on remedial defects, place questionable cases on special periodic check-ups for further x-ray films and other remedial measures, and maintain an individual health record system which is available when placement changes are contemplated.

A word might be put in at this point on the importance of planning a record system which will give information rapidly and dependably. Nothing so important as the health of a human being should be contingent upon slow and un-

certain clerical procedures.

A company nurse told us of a case in her company that illustrates this point. Months after a returning veteran had been found through the company's health program to have tuberculosis, the referral came through from the armed forces. He was already in the sanatorium when that follow-up came through. Veterans who recently were given a physical examination by the armed forces sometimes resent having to take another, but a case like this suggests that it's worth while.

I was told that often the individual worker is not sold on the benefits he derives from the industrial health program. Too often he mistakes the motives, misunderstands the requirements, and fails to appreciate the bad news as well as the good news that is the result of the examination. "The time to sell a man on his physical examination is before he is hired," one industrial nurse told me. An outstanding health program should be regarded as one of the advantages of working for the company. How the program helps the company place the employee in work for which he is suited, how it protects him from the illnesses and injuries which can result from fellow workers' disabilities, how it strengthens the company economically - these and other selling points should never be forgotten in the health program.

Even in rare cases in which physical examination uncovers a condition which makes immediate employment inadvisable, proper handling of the situation can win friends for a company. We have a case where an applicant wound up in a tuberculosis sanatorium. His chest x-ray film showed an active case of tuberculosis. He has more than once expressed his appreciation. We could have disposed of the matter without helping the man, but we believe in giving the applicant who cannot be hired for physical reasons the benefit of the information obtained. The family physician may properly have access to this information.

However, we are not always automatically welcome when we show an interest in the individual's health. He may object on general principles or because of specific fears. His cooperation in remedying defects and maintaining his health depends to a considerable degree on the salesmanship the program has been given. If a man is told practically nothing about a physical examination and the health program of the company and then given physical examinations, he is apt to regard them as mere rigmarole and something wholly in the employer's interests.

In some plants, the emphasis in winning employee cooperation is on the confidential nature of the information. The employee is told that only the doctor and nurse will know his condition, and the fact is stressed that the doctor merely classifies employees according to their ability to do certain work. Establishing relationships with the family doctor—I return to him as an unofficial but vital link in the industrial health program—is fruitful in many cases. Far greater values are realized from health programs in which effective relationships are established between examining physician, family physician, employee, and company—with, of course, full understanding and consent of the employee.

The next thing mentioned was the failure of many companies to take full advantage of the community and agency health services available to them. Even large companies find these organizations most helpful. To many small companies the difference between an adequate and an inadequate health program depends upon taking advantage of such agencies as the visiting nurse service, the Tuberculosis Association, the health departments, social service, and the rehabilitation services. Many of these services are available and could be used to a much greater extent, especially the tuberculosis services. Support contributed by a company may result in improving local services to an extent significantly supplementing the in-plant program.

No health program can be considered in isolation from other policies of the company. Closely allied are the sick leave program and its administration, and particularly the group insurance program. In too many cases an industrial health program is set up without consideration of basic

objectives, the company attitude toward its employees, and without fitting all the parts into

place.

Resolve first the question of why a health program at all? Not having clearly established their motives, many industrialists are half-way apologetic about their health programs and consider them a frill or somewhat socialistic. We need to clear up the purposes in our own minds before we go far into the mechanics and details. Do we really have any business finding out about applicants' and employees' livers and lungs? Exactly what business is it of ours?

When defining company-individual relationships, I like the statement of Dr. Leo J. Wade, medical director, Esso Standard Oil Company:

Employees are not chattels. They are personalities with freedom of thought and action. Usually the most capable are the most sensitive about their personal rights or prerogatives. When properly approached, however, these employees are inevitably cooperative. Mere common sense would dictate that an employee who is thoughtful and clever at the conservation of the company's physical assets would be equally intelligent in the conservation of his own personal health. It is his prime personal asset, not only with regard to earning a living but also for the preservation and enjoyment of living with his family and friends. The medical department can work most effectively through the employee in the attainment of the goals desired by top management.

I quote this as an example of the basic thinking which must underlie a good health program in industry. Approaches and attitudes may differ, but we should be conscious and clear concerning them. Aims of health programs consist of considerable fuzzy paternalism and uncertainty. Maybe a company wants to be paternalistic. If so, its program should fit that concept and be guided by it, not in part by some opposed theory.

Another thing these physicians and nurses told me, which needs to be faced squarely, is the problem of the wholesale as contrasted to the personal, individual approach. The temptation is to do things across the board when we should do them across the table. Wholesale advice is bad advice in many fields. You all know the man who believes in exhorting employees to work harder. At least some of the men hearing him ought not to be working so hard! They're the very ones who are likely to take his advice. The loafers won't listen. People who need the advice the least are most apt to respond. A health program should be as personal and individual as possible.

This aim is more vital — and fortunately more possible — in executive health programs. Executive health programs are now of recognized value and an industrial health program introduced today should have an executive's program as an

integral part of the plan. As soon as a man approaches executive status, he should take more care of his health than the average person. He's going to need it more, and, of course, his company needs him more.

Here again we are forced to look beyond the health program itself. We want to prepare the man for the pressures of executive responsibility, but why not at the same time take a sober look at those pressures and the basic philosophy and tempo of the business? Preventive medicine for employees is part of the picture, but how about preventive management for the sake of executives? It becomes rather absurd to prepare men for special responsibilities, then to load them with nonessential details or to put them on the ulcer speedway by allowing them to drive themselves too hard. Conservation of energies as well as development of more health and vigor belongs among our objectives. All these factors are as much a part of the health program of the company in the final analysis as the decision to have physical examinations or the adoption of forms for medical records.

Dr. Carey P. McCord, writing last year in *Industrial Medicine and Surgery*, gave us a striking statement about the value of industrial health and safety programs. He said:

Management would prefer to hire only an employee's muscles, mind, loyalty, and energy. Actually management employs, in addition, the individual's habits, neuroses, ill health, home life, heredity, debts, worries, and discords.

Thus it is reasonable to say that any plant without needed medical or safety departments is lacking in the

desirable features of a good working place.

Introducing a health program in industry, I'll say at the risk of laboring the point, is best done with the active cooperation of management, physician, employees, and nurse. The most elaborate and complete program will fail or fall short of its potential usefulness unless this cooperation is present.

Management's self-interest might be assumed, because management made the decision to have a health program. However, not all of the values are recognized in every case. Here are 10 reasons for a health program which the director of our industrial nursing division mentioned to me.

1. Maintain the health of the worker.

2. Place the worker in the occupation for which he is best fitted and in which he can work safely and effectively.

3. Detect defects, correction of which will enable the worker to perform his duties better.

4. Reduce loss of time due to occupational and nonoccupational illness.

(Continued on page 458)



This department of The Journal-Lancet is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interus and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.

## Clinicopathological Conference

Minneapolis Veterans Hospital\*

Edited by James F. Hammarsten, M.D. Assisted by Donald Fry, M.D.

CASE 15

PRESENTATION OF CASE

A 27-year-old farmer was admitted on Febru-

ary 14, 1952 because of back pain.

On December 10, 1951 he had the onset of pain over the right sacroiliac joint. The pain was dull and constant, but occasionally was sharp and radiated down the medial portion of the right leg. The pain was aggravated by coughing, sneezing, and straining at the stool. He had four attacks of a similar pain since 1945. Previously the pain was precipitated by heavy lifting and did not radiate to the leg.

The past and family history were noncontribu-

tory.

Physical examination disclosed asymmetry of the abdomen with fullness in the left upper quadrant. A nontender resilient mass was found on the left side of the abdomen. There was straightening of the lumbar curve with spasm of the erector spinal muscles, more pronounced on the right. Straight leg raising on the right produced back pain.

The temperature and pulse rate were normal and the blood pressure 124 mm. Hg systolic and 80

diastolic.

Several urinalyses were negative. The white blood cell count was 15,300 with 67 per cent neutrophils, 30 per cent lymphocytes, 2 per cent monocytes, and 1 per cent basophils. The hemoglobin was 18.9 gm. per 100 cc., red blood cell count 6.41 million, hematocrit 62 per cent, MCD 7 micra, MCV 94 cubic micra, MCH 30 micromicrograms, and MCC 30 per cent. The platelets numbered 108,000 and the reticulocytes 1 per cent. An erythrocyte sedimentation rate was 1 mm. in one hour. A blood Kahn was negative.

The blood urea nitrogen was 9.0 mg. per 100 cc.



Fig. 1. Roentgenogram after a barium enema. Colon is displaced to the right, but the splenic flexure remains high.

The PSP excretion was 10 per cent in fifteen minutes and 40 per cent in thirty minutes. The urea clearance was 110 per cent. The one-minute serum bilirubin was 0.3 mg. per 100 cc. and the total 0.8 mg. The fecal urobilinogen was 96 mg. in twenty-four hours. A bone marrow examination was negative except for hyperplasia. A spinal fluid examination was negative.

Roentgenogram films of the chest were negative. Roentgen studies of the abdomen demonstrated a large mass which occupied almost the entire left side of the abdomen. The left psoas shadow was obliterated. Studies after a barium meal and a barium enema showed that the mass displaced the stomach, small intestine, and colon (figure 1). The splenic flexure, however, remained high in position.

<sup>\*</sup>Published with approval of Chief Medical Director. The statements and conclusions published by the authors are the result of their own study and do not necessarily reflect the opinion or policy of the Veterans Administration.

Intravenous urograms revealed a normal right kidnev pelvis but the left was not visualized. Roent-

genograms of the spine were negative.

He continued to complain of back pain and was afebrile. On March 12 cystoscopy and retrograde pyelography were performed. The pyelograms showed the left ureter displaced across the spine and lying superimposed upon the right ureter (figure 2). At no time was the left pelvis filled with contrast media. On March 15 he had a chill and his temperature rose to 102° F. He complained of abdominal pain and the mass became tender. The urine contained 1 plus albumin, 4 to 6 white cells, and 12 to 15 casts per high power field. A urine culture showed a coagulase negative hemolytic staphylococcus. Blood cultures were negative. He was treated with Terramycin, but remained febrile.

On March 18 a trocar was inserted beneath the 12th rib in the posterior axillary line into the mass. Seven and one-half liters of foul-smelling fluid were obtained. Cultures of this fluid showed hemolytic streptococci and hemolytic staphylococci, coagulase negative. The fluid was examined for tumor cells and none were found. Terramycin was stopped and Chloromycetin given. A catheter was left in place through the trocar opening. Diodrast was injected through this tube. The contrast media filled the mass (figure 3). The tube continued to drain a small amount of sanguinous fluid. His temperature gradually returned to normal. Roentgenograms on

March 24 showed some contrast media still in the mass.

On March 25 an operation was performed.

#### DISCUSSION

DR. RALPH SMITH\*: With respect to this case, I consulted the Cabot Cases in the New England Journal of Medicine. One case, discussed by Dr. Claude Welch, was in many respects similar to this one. Dr. Welch turned the problem over to his 9-year-old son who made the correct diagnosis. With that precedent in mind I read the protocol and showed the roentgenograms to my 5-year-old son. The best he could do was to say that the man had a banana stuck in his stomach. I am not certain I can do any better.

There are some paramount questions which, if answered correctly, will lead to the diagnosis. The first question is: Are the presenting complaints related to the present illness? I think they are. I believe he presented with complaints of a structural backache which resulted from an abnormal posture assumed because of the mass. Some things suggest a protruded intervertebral disk, but I favor the first explanation. Therefore, the present illness would date back at least four years.

The second question is: What is the character of this mass? It is nontender and resilient. From this

<sup>°</sup>Instructor in medicine, University of Minnesota and chief of medical Outpatient Clinic, Veterans Hospital. On military leave.

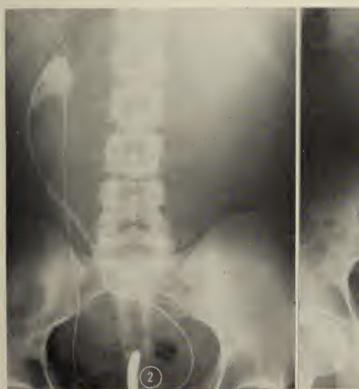




Fig. 2 (left). Retrograde pyelograms. Left ureter is displaced across the midline. Fig. 3 (right). Mass filled with Diodrast.

I assume that it had an elastic capsule with a distensible substance inside. In other words it is a cyst.

The next question is: From what does the cyst arise? The first structure I would consider is the spleen. It is very attractive to think of this mass as spleen and the hematologic findings as representing polycythemia vera. I have decided that the mass is cystic so I would have to consider that hemorrhage occurred into the spleen and that the mass was a hemorrhagic pseudocyst. I have never heard of one of this size. The splenic flexure of the colon is not displaced inferiorly. That is strong evidence against this being spleen.

An omental cyst must be considered. Such a cyst should displace the transverse colon inferiorly. A mesenteric cyst is a possibility which I can't entirely rule out.

Next I would like to speculate about the retroperitoneal organs from which this would arise. It could be a pancreatic cyst, an adrenal cyst, or a renal cyst or mass. I would rule out a perirenal hematoma because that would not affect renal function. The displacement of the renal pelvis so far to the right is against a solitary cyst. A hypernephroma with cystic degeneration is especially attractive in view of the reports of hypernephroma with secondary polycythemia.<sup>1</sup> However, on critical evaluation of those reports the relationship is not convincing. I believe the diagnosis is hydronephrosis. The obstruction must be at the ureteropelvic junction. I believe there is also minimal hydronephrosis on the right. With bilateral ureteropelvic obstruction, the most likely possibility is aberrant renal arteries. The abnormal urinary findings after retrograde pyelography are consistent with the introduction of bacteria into the dilated pelvis.

I am concerned about the hematologic findings. The three possibilities are erythrocytosis, erythremia, or a normal finding. Erythrocytosis is ordinarily ascribed to cardiopulmonary disease with hypox-

emia. There is nothing to suggest that. Erythremia has been related to hypernephroma, but, as I have already said, I consider that unlikely. Not enough has been found to make a diagnosis of polycythemia vera. For that diagnosis I would like to see polychromatophilia, reticulocytosis, thrombocytosis, and perhaps abnormal platelet forms. I would interpret the hematologic findings as within the normal limits of variation but at the extreme end of the distribution curve.

DR. HAMMARSTEN: The students today voted for a solitary cyst of the kidney. None of them agreed with Dr. Smith.

### DIAGNOSES

Clinical diagnosis: Hydronephrosis.

Dr. Smith's diagnosis: Hydronephrosis due to an aberrant renal artery.

Anatomical diagnosis: (1) Hydronephrosis, (2) Aberrant renal artery.

### PATHOLOGICAL DISCUSSION

DR. GLEASON: The situation was very much as Dr. Smith anticipated. A tremendously large cyst occupied the position of the left kidney but extended across the midlinc. It measured 10 in. in diameter and had a volume of 7,300 cc. The urologists tell me that only two larger specimens have been reported. An aberrant renal artery pinched the ureteropelvic junction. There was no grossly identifiable renal tissue. We did find a zone of atrophic tubules but no glomeruli.

DR. E. T. BELL: I don't believe the aberrant renal artery necessarily caused the obstruction. There was also stricture at the ureteropelvic junction. A complete block doesn't occur unless a stricture is also present.

### REFERENCE

VIDEBAEK, AAGE: Polycythemia vera. Co-existing with malignant tumours (particularly hypernephroma). Acta med. scandinav. 138:239-245, 1950.

## Lancet Editorial

## Allergy and Medical Ethics

E allergies has raised the question in my mind as to whether the old custom of keeping secret the ingredients of a medical preparation is still valid. Would it not be compatible with a higher standard of ethics to make known both to the patient and other physicians the nature of the medication in use?

The secrecy of medicine is old. The oath of Hippocrates includes a paragraph compelling the young disciple to keep secret his master's formulas. Throughout the middle ages this was practiced. The invention of the forceps in England in 1660 was kept a family secret through three generations of Doctors Chamberlen. In modern times ethics have changed. In 1921

Banting and Best published their recipe for insulin. The American Medical Association requires that the real contents of all pharmaceutical preparations be declared before they are accepted.

Hasn't the time come to label the patient's prescription with its real ingredients? Wouldn't it prevent aggravating allergic reactions if the patient is on a journey or must see a new physician for other reasons? Does the number system really bind the patient to his doctor? I should like to open discussion on the relative merits, from the standpoint of ethics, of the use of secret formulas and numbers versus use of open prescriptions.

RUDOLF ENGEL, M.D.

Manual of Proctology, by EMIL Granet, M.D., 1954. Chicago: Year Book Publishers. 346 pages. \$7.50.

This is one of a growing list of "The General Practice Manuals." This particular book is essentially a postgraduate review of a subject which looms large and important to the average general practitioner. With a much larger proportion of patients in the older age group, the average physician sees many more complications associated with the distal colon and rectum.

The average general practitioner is quite busy and, no doubt, is quite anxious to have a volume near at hand which specializes in practical guidance in the examination, diagnosis, and treatment of patients with proctologic difficulties. The author has purposely omitted much historic and experimental data in the interest of brevity. A large proportion of the text is accordingly allotted to fairly complete descriptions of procedures that can be used by the general practitioner with the equipment normally at his disposal.

The volume is well printed and



has an excellent index. It will prove to be an excellent addition to the library of a large number of physicians.

REUBEN ERICKSON, M.D.

Diseases of the Liver, by MITCHELL A. SPELLBERG, M.D., 1954. New York City: Grune & Stratton. 646 pages. \$16.50.

In a foreword to Spellberg's Diseases of the Liver, Walter L. Palmer remarks cogently that the liver is a mysterious and wonderful organ. One can understand the many activities of the brain from knowing the structural complexity of that organ. But the liver has only one specific cell and the anatomic arrangement

of blood vessels, sinuses, and ducts is comparatively simple. Many functions of the liver are known, but many other metabolic and chemical processes presumed to be performed by the polygonal hepatic cell have not been completely elucidated. Hepatic death is not understood.

What is known about the normal and disturbed liver is ably explained by Spellberg. The first section deals with functional laboratory tests and the second with morphologic diagnosis by biopsy. Thus the newest and most important matters are given primacy in the total exposition.

Each section is begun with an outline of the intended discussion and conducted with a summary in bold faced type of the material presented. Because of this plan, access to desired details is easy and rapid. This arrangement complements an adequate index and a reference list of about 2,400 relevant titles.

The third section is a particularly valuable elucidation of the differential diagnosis of jaundice, augmented by original tables and diagrams which sharply clarify the subject. Included in this section are

diseases of the gallbladder and biliary tract, the usefulness and significance of cholangiography and choleevstography.

Tumors of the liver are considered in section four and effects of toxic and infectious agents in sections five

The liver as affected by diet, endocrine glands, other systemic diseases and metabolic derangements are adequately expounded. An entire section is concerned with cirrhosis of the liver and another is devoted to anatomy and vascular supply.

Altogether the field of hepatic disease is completely covered.

The large page size, 7¾ in. by 10% in., double column and fair sized and spaced type make for easy reading and reduce the thickness of the book. Also tables, diagrams, photographs, and drawings are allowed sufficient space so that details are clear.

A detailed review of such a comprehensive treatisc is impossible. The book gives all essential information about the liver, normal and abnormal, its diseases, functions, and dysfunctions that may be needed by the practitioner, internist, surgeon, gastroenterologist, or clinical pathologist. The text comprises sufficient basic anatomic and physiologic data to satisfy the basic scientist, undergraduate, or postgraduate student.

JAMES B. CAREY, M.D.

The Mechanism of Inflammation, edited by G. Jasmin, M.D., and A. Robert, M.D., 1953. Montreal, Canada: ACTA, Inc. 278 pages. \$8.50.

This monograph is a collection of presented papers and formal and informal discussions by an international collection of contemporary fundamental researchers in a symposium on inflammation as conducted in Montreal in the fall of 1953. It brings the authorities' viewpoints up-to-date in this controversial, currently very popular, and critical field in basic research. The biology, chemistry, physiology, and histology of inflammation and repair are discussed, and the steroid compounds, histamine, antihistamines, and the hypersensitive field are brought into the treatise in a major way. It is nicely edited and has an excellent index for reference by basic science workers and interested clinicians.

JAMES MYHRE, M.D.

Lung Cancer, by SEYMOUR M. FAR-BER, M.D., 1954. Springfield, Illinois: Charles C Thomas, 157 pages, cloth. \$4.75.

Here is an up-to-date book on lung cancer which is most timely. Never before has there been so much interest manifested in this subject, not only by professional workers but also by the public everywhere. In this volume of 157 pages, Dr. Farber has brought together in a concise and practical manner all important available facts concerning this disease. His extensive experience in diagnosis and treatment of lung cancer enabled him to eliminate extraneous and questionable viewpoints and procedures so as to include proved diagnostic measures and to emphasize the promptness with which they must be executed. When the etiology of a demonstrable pulmonary lesion is not readily determined, particularly in persons 35 years of age and over, there is no time for the "wait and see what happens" practice. One must go directly to the lesion and let the pathologist determine the diagnosis.

A day comes as well as an hour in that day when each pulmonary malignancy metastasizes. When this will occur no one knows. Therefore, prompt diagnosis and immediate removal of primary lung cancer is imperative. Nothing is gained if the primary lesion is removed one hour after it has metastasized. Dr. Farber presents all of this and much more in diagnosis step by step.

He calls attention to the unfortunate fact that about 90 per cent of the cancers of the lungs are diagnosed after metastasis has occurred, and emphasizes the responsibility of the physician in caring for such individuals with the full knowledge that there is no hope for recovery. Palliative procedures for such cases are presented. "A real challenge to the physician's art is a patient who is inoperable on diagnosis or has postoperative recurrence."

While the world is waiting for a specific test that will determine the presence of cancer while still of microscopic size and thus alert the physician to the importance of locating the disease at the earliest possible moment, much can be done to improve the present situation.

This is a book which should be read and studied by physicians everywhere and particularly by those in general practice to whom the majority of persons developing cancer first appear and to whom this book is primarily directed.

J. A. Myers, M.D.

Illustrated Review of Fracture Treatment, by F. L. LIEBOLT, M.D., 1954. New York City: Lange, Maxwell and Springer, Inc. \$4.00. This review of fracture treatment is unusually well planned, concise in form, actually a well organized outline of fractures and their treatment. The numerous illustrations are excellent, particularly with respect to drawings concerning mechanisms of injury. This book should serve as an excellent source of reference and information for the general practitioner. It provides the general practitioner with much technical orthopedic information regarding procedures utilized in complicated cases which would assist him in following patients who had been referred to

RICHARD H. JONES, M.D.

How to Help Older People, by Mrs. Julietta K. Arthur, 1954. Philadelphia and New York: J. B. Lippincott Co. 500 pages. \$4.95. Mrs. Arthur has brought together a tremendous amount of material in a book correctly described as "A Guide for You and Your Family." The first four-fifths of the book is a compendium of the latest knowledge concerning all aspects of aging presented in highly useable form with numerous illustrative cases. The last fifth is the only available comprehensive directory of numerous sources of help.

orthopedic surgeons.

How to Help Older People has an enthusiastic introduction by gerontologist Wilma Donahue. book will be useful to geriatricians and can be recommended by them to their older patients and to the families of such patients.

CLARK TIBBITTS

Children for the Childless, edited by Morris Fishbein, M.D., 1954. Garden City, New York: Doubleday and Co., Inc. 223 pages. \$2.95. This is an excellent book with chapters contributed by 8 able specialists who discuss such problems as being a parent today, the physical aspects of fertility and sterility, psychosomatic aspects of fertility and sterility, human sterility, artificial insemination, and adoption. The book is written so well that laymen can understand the text.

This book brings answers to the many questions which intelligent people are asking today when the much desired pregnancy does not occur. Here is a book which tells what may possibly be done to over-

come infertility.

WALTER C. ALVAREZ, M.D.



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## A.C.H.A. News

President Moore stopped in Detroit on September 13 for a conference with the secretary to set up the committee organization for the coming year.

Dr. Canuteson of the University of Kansas has accepted the chairmanship of a committee for study and general revision of the constitution. Such changes as may be advised will be presented to the association at the Colorado meeting.

Dr. Sawhill of New York University has accepted the chairmanship of a special committee for the study of problems of faculty care by student health services. Dr. Dana Farnsworth will be chairman of a committee to study the standardization of health service records. This committee will attempt during this coming year to devise a standardized form which can be recommended to all student health services. Dr. John Summerskill, of Cornell University, will serve as chairman of the committee on research. Dr. John Grant of Iowa State College of Agriculture and Mechanic Arts has accepted the chairmanship of the committee on health service and physical activities. Dr. Lewis Barbato, of the University of Denver, will be chairman of the committee on local arrangements for the Colorado meeting. Drs. Max Durfee and A. O. DeWeese will continue as chairmen of the committee on tuberculosis and the committee on health instruction, respectively.

Each of the chairmen will select his own committee. All committee appointments will be announced as soon as possible. Any member who has a special interest in one of the committees and who desires to serve on such a committee should write to the secretary immediately.

The executive committee has approved membership applications from the following institutions: Georgetown University, Washington 7, D. C.: Augsburg College, Minneapolis, Minnesota; and Florida State University, Tallahassee, Florida.

### HOW TO ESTABLISH AN INDUSTRIAL HEALTH PROGRAM (Continued from page 451)

- 5. Prevent the spread of communicable and infectious diseases and give the worker confidence his associates are safe companions.
  - 6. Reduce the annual labor turnover.
  - 7. Add to the longevity of the worker.
- 8. Reduce the extent and duration of disability of injured workers who may suffer from complications if injury is not promptly treated.

9. Improve community health.

10. Help make a better product at lower cost. I have spent a good deal of time selling the values of a good industrial health program. I've included more on that phase of the subject than

included more on that phase of the subject than I have on the detailed mechanics of setting up a program, but I don't feel that I have talked too far beside the point. The appreciation of the values of such a program is the foundation for successful work in the industrial health field.

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-From "Comparative Clinical Effectiveness of Cough Medication", by L. J. Cass and W. S. Frederik, in American Practitioner and Digest of Treatment, Vol. 2, p. 844, October, 1951.

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## News Briefs . . .

### North Dakota

The following physicians have been licensed to practice in North Dakota as a result of the July 1954 examination of the State Board of Medical Examiners:

Chester C. Borrud, Fargo, N. D.; Robert F. Burns, Carrington, N. D.; Wellde W. Frey, Drayton, N. D.; Leo B. Froke, Grand Forks, N. D.; Robert C. Gaebe, New Salem, N. D.; Milton R. Gilchrist, Rolla, N.D.; Lloyd A. Giltner, Minot, N. D.; John R. Goff, Rochester, Minn.; George H. Hilts, Cando, N. D.; William H. Knobloch, Bottineau, N. D.; Robert H. Kooiker, Jamestown, N. D.; Wallace K. Kucera, St. Paul, Minn.; Donald H. Lawrence, Fargo, N. D.; Carl B. London, Minot, N. D.

Edward J. Mears, Bismarck, N. D.; Daniel N. Mcrgens, Hillsboro, N. D.; R. J. Miller, Leeds, N. D.; Henry A. Norum, Fargo, N. D.; Welland J. Orchard, Jr., Fargo, N. D.; Samuel L. Pettit, Grand Forks, N.D.; Gale R. Richardson, Minot, N. D.; Charles F. Schnee, Garrison, N. D.; David F. Simpson, Winnipeg, Manitoba; Richard M. Steidl, Fargo, N. D.; Perry O. Triggs, Fargo, N. D.; and Herbert C. Winge, Wahpeton, N. D.

The University of North Dakota school of medicine is playing a vital role in the battle against polio. The research laboratory at the university is one of 13 in the United States equipped to test blood samples from children all over the United States. The school recently received a grant of \$10,500 to carry out this work, which is to be under direction of Dr. Robert G. Fischer, associate professor of bacteriology at the university.

VALLEY CITY CLINIC began functioning as an organization in September. Purpose of the clinic is to offer improved facilities for the general practice of medicine, surgery, and obstetrics. The staff includes Drs. G. Christianson, W. H. Gilsdorf, C. J. Klein, and J. P. Merrett.

The North Dakota Society of Obstetrics and Gynecology met September 17 and 18 in Williston. New members elected to the society were: Drs. Harlan C. Nelson, Dickinson; P. L. Blumenthal, Mandan; Rodger Sorenson, Minot; E. J. Hagan, Williston; J. D. Craven, Williston; A. G. Sathe, Williston; Loren L. Hoopes, Minot; Robert H. DcLano, Northwood; David Jaehning, Wahpeton; E. J. Beithon, Wahpeton, and Clyde L. Smith, Bismarck

Officers for the ensuing year are: Dr. J. W. Jansonius, Jamestown, member of the board of governors; Dr. Carroll M. Lund, Williston, president; Dr. R. W. Rodgers, Dickinson, vice president; and Dr. John S. Gillam, Fargo, secretary-treasurer.

The North Dakota-Manitoba Urological Society met September 4 and 5 at Detroit Lakes, Minnesota. The following officers were elected for the ensuing year: Dr. John Sandmeyer, Grand Forks, president; Dr. Joseph Bourgouin, Winnipeg, vice president; and Dr. Louis F. Pine, Devils Lake, secretary-treasurer. Dr. Frederic E. Foley was guest speaker.

Dr. James V. Miles, Jr., associated with the DePuy-Sorkness Clinic since 1948, has been granted leave of absence to take a specialized training course in pediatrics at the Mayo Clinic. Upon completion of the course, Dr. Miles will return to Jamestown and resume his affiliation with the DePuy-Sorkness Clinic.

Dr. Harlan L. Papenfuss has been appointed assistant professor of pathology at the University of North Dakota school of medicine. Dr. Papenfuss received his M.D. degree from Creighton University in 1948 and his M.S. degree in pathology from Creighton graduate school in 1953. Prior to his appointment he taught pathology at the United States Naval Hospital, San Diego, Calif.

Dr. John Peter, eye specialist, has become an associate of Dr. John J. Ayash, eye, car, nose, and throat specialist, in Minot. Dr. Peter comes to Minot from Thigpen-Cater Eye Hospital in Birmingham, Alabama, where he was chief resident.

DR. ALLEN W. WITTCHOW, a graduate of the University of Wisconsin medical school, has joined the staff of Quain and Ramstad Clinic in Bismarck. A specialist in the treatment of eye diseases, Dr. Wittchow completed a three-year fellowship in ophthalmology at the Mayo Clinic and practiced in St. Paul, Minnesota, prior to coming to Bismarck.

Dr. Robert D. Story, recently discharged from the Army Medical Corps, has returned to join the department of internal medicine at the Fargo Clinic.

DR. LLOYD A. GILTNER, a native of North Dakota, is the new associate of Drs. A. R. Sorenson, Roger Sorenson, and V. J. Fischer at Minot. Dr. Giltner is a graduate of Northwestern University school of medicine.

Dr. Milton Gilchrist has joined Dr. A. M. Miles in the practice of medicine and surgery at Rolla. Dr. Gilchrist recently completed a year of postgraduate work in surgery at York, Pennsylvania.

### Minnesota

A free diabetes detection drive to take place in Minneapolis during National Diabetes week, November 14 through 20, has been announced by Dr. Moses Barron, chairman of the Diabetes Association of Greater Minneapolis. The Dreypak method is to be used, and it will be the fourth mass diabetes check in five years for Minneapolis.

DR. James R. Fox, of the University of Minnesota, recently returned from Europe where he conducted a survey of medical facilities and payment plans in Great Britain, the Scandinavian countries, and Switzerland. Dr. Fox also addressed medical groups in Italy, Greece, and Spain, and spent a short time behind the Iron Curtain in Eastern Germany. The trip was sponsored by the American Medical Association and the World Medical Association. Cooperation given Dr. Fox by the governments and medical associations of the countries surveyed was complete and without reservation. His findings and comparisons will be presented on the radio and television programs "How's Your Health."

Dr. Charles W. Mayo, of Rochester, was one of four men to receive honorary fellowships from the American College of Hospital Administration in Chicago.

Dr. Lee McKendrick Eaton, of the Mayo Clinic has accepted membership on the medical advisory board of the Myasthenia Gravis Foundation, Inc., New York City.

Dr. WILLIAM B. TUCKER, chief of the tuberculosis service at Minneapolis Veterans Hospital for the past seven



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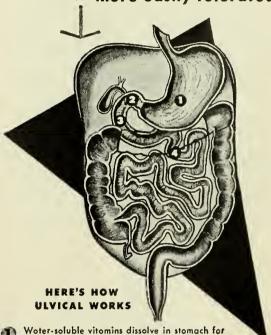


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Equally effective in geriatrics.

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Ascarbic Acid ... 16.66 mg.
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(Ca 150 mg. P 120 mg.) 7.5 gr.
Ferraus Sulfate USP (Fe. 38 mg.)...... 3 gr. Vitamin E............. 2 mg. Dosage: One tablet 3 times a day as a supplement, 2 tablets 3 times a day for therapeutic use.

PHARMACAL COMPANY Minneapolis 3, Minnesota

years, is now chief of the pulmonary disease service of Veterans Administration Hospital at Durham, North Carolina. Dr. W. W. Stead succeeds his position in Minneapolis.

Dr. N. Rysen, formerly of Oxford, Mississippi, joined the medical staff of the local clinic at Clarkfield early in October.

Dr. Elbert Gamble, who recently completed a year's residency in psychiatry at the Hastings State Hospital, has established a medical practice in Bricelyn.

### South Dakota

Proposal of a \$25,000 fund for the education of medical students was made recently by Dr. D. B. Rice at a meeting of the Britton Chamber of Commerce. Purpose of the plan is to provide physicians to take the place of the present Britton Clinic staff when they retire. Students receiving help from the fund would be expected to reimburse the money borrowed after start of their medical practice.

THE GRADE SCHOOL CLINIC, sponsored by Faulk County Crippled Children's Society and Faulk County Tuberculosis and Health Association, received splendid cooperation from parents, school authorities, and volunteer workers. The clinic, which began operation early in October, was open to children of grade school age from Faulk County. Because of the tremendous amount of work entailed in examining and inoculating these children, preschool children could not be cared for this year.

Dr. Joseph P. Ohlmacher received a Distinguished Service Award a short time ago from the South Dakota Medical Association for his many years of devoted service to the practice of medicinc. The award was presented at a dinner given by the Aberdeen Medical Society. Dr. Ohlmacher was a pathologist at the University of South Dakota for thirty-four years, retiring in 1952. He then accepted a position as pathologist at St. Luke's Hospital in Aberdeen, which position he held until August 1954 when he again retired and returned to Vermillion to make his home.

Dr. Harry T. Kenney, a Watertown physician, has been nominated the general practitioner of the year by the South Dakota Medical Association. The association also recently awarded him a pin representing fifty years of practice in South Dakota.

Dr. Herbert A. Hudgins is the new medical officer of the Aberdeen area of the Bureau of Indian Affairs. Succeeding Dr. Edwin Shelby, Dr. Hudgins is responsible for the public health, hospital, and medical care program for the Indians within the area.

DR. TERRANCE McManus, of Wessington Springs, is now conducting office hours at Whiting Memorial Clinic in Woonsocket three half days a week, Tuesday and Thursday afternoons, and Saturday morning.

### Deaths . . .

Dr. W. A. Liebeler, 56, well-known physician and surgeon of Grand Forks, North Dakota, died September 22. Dr. Liebeler was past president of the North Dakota Medical Association.

Dr. Olaf Sand, 83, physician in Fargo, North Dakota from 1905 until his retirement in 1953, died September 28. Dr. Sand was one of the founders of the Fargo Clinic and St. Luke's Hospital.

DR. H. L. LAZAR, 72, of Excelsior township, Minnesota, died October 13. Dr. Lazar apparently drowned when he fell into Lake Minnetonka from a fishing dock at his home. It is believed he may have suffered a heart attack before falling into the water.

Dr. Owen W. Parker, 80, many years a partner in the Shipman Hospital, Ely, Minnesota, died September 18. In 1942, Dr. Parker became associated with the clinic in Duluth, Minnesota, and two years later joined the staff of the Moose Lake State Hospital. He was a former president of the Northern Minnesota Medical Society.

Dr. Maxwell Liebert, 59, died of a heart attack September 3. Dr. Liebert was a staff physician at the South Dakota State Hospital for three years.

#### MEDICAL SCHOOL ENROLLMENTS

Availability of medical schools, and a high per capita income in a given area, have a bearing on the number of applicants for medical training, according to a recent survey by John M. Stalnaker, director of studies for the Association of American Colleges.

Number of colleges in the state is not necessarily related to the volume of applicants, nor is the phy-

sician's per capita income.

Medical schools in various geographic areas in the country have about the same number of openings available for freshmen, with 5 per 100,000 population reported. The larger the number of practicing physicians in a state relative to population, the greater the interest is in obtaining medical education.

There has been an over-all decrease in the number of applicants from that of preceding years for the country as a whole. Area-wise, the Middle Atlantic states lead with 14 applicants per 100,000 population as contrasted with a national average of 9.

Highest acceptance ratios were in Iowa with 5 out of 6, North Dakota with 7 out of 9, and Tennessee with 5 out of 7.



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#### PUBLIC HEALTH SERVICE BULLETINS GEIGY PRODUCT

"A new synthetic anti-rheumatic drug, which does not have hormonal effects of cortisone, has been shown to exert anti-rheumatic effects in gouty arthritis and rheumatoid arthritis. Dr. Bernard B. Brodie, chief of the pharmacology laboratory of the Public Heart Service's National Heart Institute, of the Department of Health, Education, and Welfare, and colleagues at Goldwater Memorial Hospital and Mt. Sinai Hospital, New York, N. Y., reported on the new drug at the meeting of the Society for Pharmacology and Experimental Therapeu-

tics in Charlottesville, Virginia.

Recently introduced, the drug G-25671 (a Geigy compound) is a derivative of phenylbutazone (Butazolidín). Ît exerts a less powerful anti-rheumatic effect but does not cause retention of sodium and water, thus showing that there is a possibility of eliminating at least one harmful effect of phenylbutazone. In addition, the new compound lowers blood uric acid to a marked degree by causing its excretion in urine. This work is part of a program to develop a drug retaining the anti-rheumatic action of phenylbutazone but devoid of its side effects. A series of drugs is being sereened in animals and man for anti-inflammatory activity. If further experimentation should indicate that the new drug has such low toxicity that long-term administration is feasible, G-25671 with its combined anti-rheumatic and uricosuric effects may prove useful in treatment of chronic gout.

A study on the use of Mephate "Robins" in Parkinsonism is being directed by Dr. Robert S. Schwab, associate professor of neurology at Harvard Medical School and director of the Brain Wave Laboratory at Massachusetts General Hospital. The investigation, supported through a grant by the A. H. Robins Co., Inc., Richmond, Va., will deal with selected patients whose baseline of progress on presently available therapy has already been established. Mephate contains mephenesin and glutamic acid hydrochloride.

#### BUTADONNA CAPSULES RELEASED BY WAMPOLE

Butadonna has been found useful in hypertonic and spastic states of the gastrointestinal, genito-urinary and biliary tracts, especially whenever nervous tensions complicate the condition: pylorospasm, gastritis, colitis, biliary colic, post-encephalitis, parkinsonism, dysmenorrhea, tenesmus, functional nausea and vomiting, motion sickness. For adjunctive management of peptic ulcer and gastric disorders associated with hyperacidity, Butadonna capsules, a spasmolytic sedative, are now available at all leading wholesale druggists. The manufacturers are Wampole Laboratories, Philadelphia.

#### ELI LILLY & CO. MAKES RESEARCH GRANTS

A New York City hospital and eight universities will benefit from research grants announced recently by Eli Lilly and Company. The grants will support research projects. Among the following institutions is the University of Minnesota with a grant for one year for studies on the relationship of Vitamin B12 and intrinsic factor (Continued on page 40A)



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## Journal Lancet

SERVING THE MEDICAL PROFESSION OF MINNESOTA, NORTH DAKOTA, SOUTH DAKOTA AND MONTANA

## Problems in the Recognition and Treatment of Pericarditis\*

HOWARD B. BURCHELL, M.D.

Rochester, Minnesota

An affection of the pericardium often plays a role in the drama and tragedy presented by morbid processes and it may do so as either a minor actor or the central figure dominating the other miscreants on the stage. Inflammation of the pericardium may appear as a complication of many diseases but it is particularly prone to occur with a pneumonitis. Some rarities always come to mind, such as a patient who had tularemic pericarditis, another with amebic pericarditis, the latter caused by a rupture of an amebic abscess in the left lobe of the liver into the pericardium, and still a third had a suppurative pericarditis from a myocardial abscess.

A recent review of the problem of pericarditis<sup>1</sup> has been published in the "Clinical Progress" section of *Circulation*, and outlines particularly well the etiologic background of pericardiac disease.

Of local historic interest is the fact that the first medical article on the heart published in Minnesota concerned suspected pericardiac disease or at least a pericardiac effusion. It is written with pithy frankness and some vituperation, with the opening sentence, "The question is often asked with more ridicule than respect, 'When doctors disagree, who shall decide?'

HOWARD B. BURCHELL, a 1932 graduate of the University of Toronto Faculty of Medicine, is with the section of medicine at the Mayo Clinic and is assistant professor of medicine in the Mayo Foundation.

"... all [consultants] pronounced the case one of unmistakable pericardiac effusion, of which they assured the patient there was a large quantity and they could give at least temporary if not permanent relief in withdrawing the fluid by the operation of tapping the pericardium, which they performed with the comparatively modern instrument known as the aspirator . . . So the instrument was cleansed, a larger needle substituted and passed within the cavity of the chest, and another pumping resorted to, but with no other result than that of great pain to the patient, he averring that the instrument was in his heart and demanding it be withdrawn instantly . . ."

This problem case described by Squires<sup>2</sup> in 1880 points out a difficulty which is still recognized today — that is, the obstacles confronted both in diagnosing a pericardiac effusion and in its successful tapping. In a survey of cardiovascular specialists, Kotte and McGuire<sup>3</sup> found that opinion differs concerning the best route of pericardiac paracentesis, the first choices being either the apical or the subxiphoid. A few consultants preferred the interspace beside the sternum, either the right or left side. When universal opinion concerning any procedure is lacking to such an extent, it is evident that no one method

<sup>\*</sup>Read at the Postgraduate Course on Cardiovascular Disease, Continuation Center, University of Minnesota, March 22 to 24, 1954.

has been completely satisfactory. Probably cases of severe complications from pericardiac tapping have not been adequately reported. I remember that as a medical student one of the first necropsies I ever witnessed was that of a patient who had died from laceration by a needle of the anterior descending branch of the left coronary artery.

While idiopathic or nonspecific types of pericarditis have been recognized for some time, the simulation of an acute myocardiac infarction by an acute pericarditis was apparently not well publicized until after the paper by Barnes and myself.4 We have not had occasion to alter the views stated in that original report and the patients who were reported had no subsequent illness to indicate that our diagnoses were in error. The differentiation of chest pain due to myocardiac infarction and that due to acute pericarditis has an added importance in respect to therapy, anticoagulant therapy being indicated in the former and contraindicated in the latter. Indeed another therapeutic contrast needs emphasis in respect to pericarditis appearing as the sole clinical evidence of cither rheumatic fever or tuberculosis. Cortisone may be utilized in the former but is contraindicated in the latter.

Several problems have not been completely elucidated, particularly the exact nature of the enlargement of the cardiac shadow in some cases and its rapid return to normal. While pericardiac fluid may be the usual explanation, as yet this cannot be said to be the established explanation for all cases. The electrocardiographic picture of pericarditis shows considerable variation and, as emphasized previously,4 the sequence of electrocardiograms is often more important than any individual tracing. It should be understood that acute myocardiac infarction complicated by pericarditis,5 particularly in young people, and even more so if it happens to follow an infection, may create a particularly perplexing diagnostic problem. Thus, in an occasional patient, the diagnosis may of necessity be indeterminate for a considerable period. The characteristic rapidity of change in electrocardiograms is important diagnostically (figure 1). The illustration given is particularly interesting since the record went through a rapid phase from segment elevation to one of T-wave inversion and then returned to the pattern of elevation. This sequence of records is unusual in regard to the magnitude of the voltage of the inverted T wave. Characteristically, the electrocardiograms in the acute or early phase show a depression of the segment in those leads that would face toward the cavity of the heart, that is,  $V_R$  or, if one

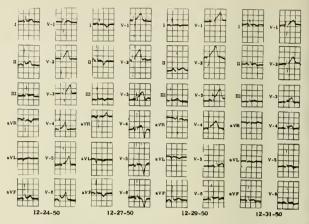


Fig. 1. Electrocardiograms of a young patient with acute idiopathic pericarditis.

wishes to take them, esophageal leads at the atrial level.

The electrocardiograms illustrated (figure 1) are of a 26-year-old postgraduate medical student who, in December, 1950, complained of general malaise and muscular aches and had a slight fever for two days. These symptoms recurred two weeks afterward with a temperature of 104° F., and he was hospitalized. At this time the spleen could be felt and evidence of pneumonitis was present in the right lower lobe. He was placed on 2 gm. of Aureomycin daily. Retrosternal pain developed two days later, which was synchronous with the heart beat, and this pain persisted on and off for several days. No pericardiac rub was heard. The history and electrocardiogram gave an adequate basis for the diagnosis of pericarditis complicating pneumonitis, probably of the virus type. The patient returned to work on January 30, 1951, and had no further difficulties.

From an electrocardiographic point of view, of some interest is the fact that a functional type of electrocardiographic change of ST-segment shifts may mimic the picture of acute pericarditis, and sometimes only by repeated tracings can it be seen that this type does not change nor is it associated with any evidence of a disease proc-

ess within the pericardium.

There is a type of idiopathic pericarditis which seems identical in its onset to the case described in a previous paragraph but is additionally characterized by multiple recurrences. The term "acute relapsing pericarditis" has been suggested. As an example, the following history is given:

A lawyer, 37 years of age, on July 18, 1948, had substernal pain which became progressively more severe throughout the day. He was hospitalized elsewhere with the tentative diagnosis of coronary thrombosis. The pain persisted for a week and the diagnosis was changed to pericarditis. He felt fairly well for about four weeks; then, on August 19, severe chest pain recurred which extended to both shoulders and persisted for ten days. The electrocardiograms again were abnormal and indicative of pericarditis. He was severely ill and was said to have "3 nurses in attendance." On September 5, the third episode of severe pain began, followed by re-



hospitalization and relief in about a week. On September 25, a fourth episode of pain occurred which lasted only twenty-four hours. On October 3, the fifth episode of pain occurred and narcoties were again needed.

On October 6, the patient was admitted to the Mayo Clinie and hospitalized with fever and tachycardia which lasted four days. He appeared very ill, and Demerol was given repeatedly for pain in the precordial area and left shoulder which was aggravated by breathing. The sedimentation rate (Westergren) on admission was 109 mm. in one hour and gradually fell to 40. No leukocytosis nor abnormality appeared in the blood smear. On October 24, pain and fever again occurred persisting a few days. He returned to his work in December. How-



Fig. 3. Apical portion of heart and pericardium of patient whose roentgenogram and electrocardiogram are shown in figure 2. (Courtesy of Dr. J. E. Edwards, section of pathologic anatomy, Mayo Clinic.)

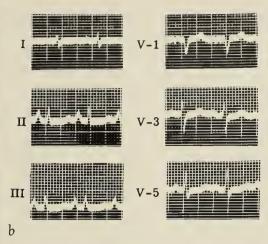


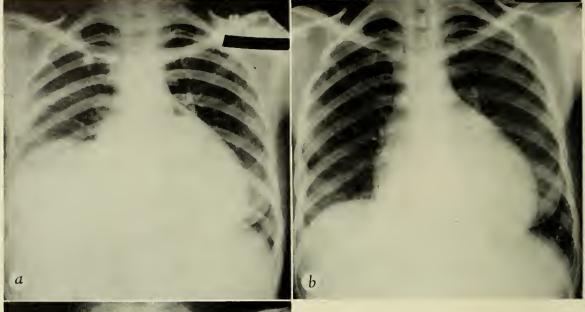
Fig. 2a. Chest roentgenogram of patient with chronic pericardiac effusion and constrictive epicarditis. Note normal size of cardiac silhouette and clear lung fields. b. The electrocardiogram.

ever, on December 24, he experienced the seventh modcrate episode but normal activity was maintained despite the distress. He shoveled snow and worked hard without exacerbation during January. On February 6, 1949, another episode occurred which ran its characteristic course in a week, during which time he continued to work. In May and July, 1951, he mentioned in a letter that he had had attacks of a mild type which lasted a week. In April, 1954, he wrote that he had continued to feel well, was active, and noted only occasional sharp jabs of pain in the left shoulder.

It has been properly emphasized that in most cases of idiopathic pericarditis the prognosis is excellent. Despite the asthenia and aching chest pains that may be experienced for some months, the patient eventually enjoys his previous good health. In the adolescent or young adult patient the possibility of rheumatic fever should be a first consideration, and management should be based on such a premise. Some concern always arises as to whether the episode of "idiopathic pericarditis" in the adult could be a forerunner of something serious such as lupus erythematosus, periarteritis nodosa, or the incipient phase of a tuberculous or neoplastic disease. The two last-named conditions can both go through a phase characterized by chest pain, pericardiac effusion followed by a remission of all symptoms and a return of the cardiac shadow to normal size, which may persist for some months.

In a few cases of "idiopathic pericarditis" a pericardiac effusion may become chronic. It is of some importance to recognize this syndrome before general debility has developed which would cause the patient to become a very high surgical risk. As an example:

A 40-year-old physician had the onset of acute substernal pain in September, 1948; dyspnea and fever developed. A pericardiae friction rub was heard; he felt





ill for four days, then convalesced for a month, after which he was able to return to work. In February, 1949, discomfort in the right upper quadrant and slight edema of the legs developed. The patient experienced a substernal fullness when he exercised. Treatment with mercurial diuretics was initiated and he improved for a short period, and then became more dyspneic and fatigued. He was admitted to the clinic in June, 1949, with the general picture of constrictive pericarditis, that is, distended neck veins, enlarged, firm liver, moderate ascites, and slight edema. Very mild jaundice was present, the bilirubin measuring 3 mg. per 100 cc. of serum direct and 2.3 mg. per 100 cc. of serum indirect. He was slightly cyanotic, the arterial saturation being 82 per cent. He had a dry hacking cough and orthopnea. The venous pressure was 25 cm. of water. The blood urea was 88 mg. per 100 cc. The heart was not enlarged (figure 2), and for this reason pericardiac effu-

Fig. 4. Chest roentgenograms of patient with a chronic pericardiac effusion. a. May 17, 1951. Note small triangle at right upper border of the cardiac silhouette related to air in the pericardiac sac. b. May 30, 1951. Large globular cardiac silhouette; pleural effusion has gone. c. August 11, 1952. Normal chest roentgenogram.

sion was not thought to be significant, but rather that the whole pericardium was thickened and constricting. It was believed that the patient's condition might improve in the hospital so that surgical exploration could be carried out, but he died suddenly within a few days. Of pertinent interest is the fact that at necropsy there was a bloody pericardiac effusion and he had a thick, constricting epicardium rather than a constricting pericardium (figure 3). Whether the fluid also produced a cardiac tamponade is difficult to say, but it may have contributed at least to the picture and if it had been removed earlier, a different outcome might have been expected. The histologic examination and cultures gave no clue to the etiologic agent of the condition.

A patient with an initial history somewhat the same as the foregoing but who had a better outcome is illustrated by the following report:

A married woman, 26 years of age, had undergone right oophorectomy April 4 for a follicular cyst. Effort dyspnea occurred two weeks later and thoracentesis had been carried out on a number of occasions. She had had no fever.

In May the patient registered at the clinic and thoracentesis was performed, on which the culture and cytologic studies were negative. In July she returned because of shortness of breath, edema, and ascites. At this time the cardiac silhouette was large, hepatomegalia was present, and the general picture was that of constrictive pericarditis. No pleural effusion was present. A pericardiac tap was done and fluid was obtained which was negative on culture. After withdrawal of fluid a small amount of air was introduced which demonstrated a free pericardiac space (figure 4). Exploration of the pericardium was advised, and a bloody effusion under pressure was found. The heart itself was quite small. A permanent fistula was left between the pericardium

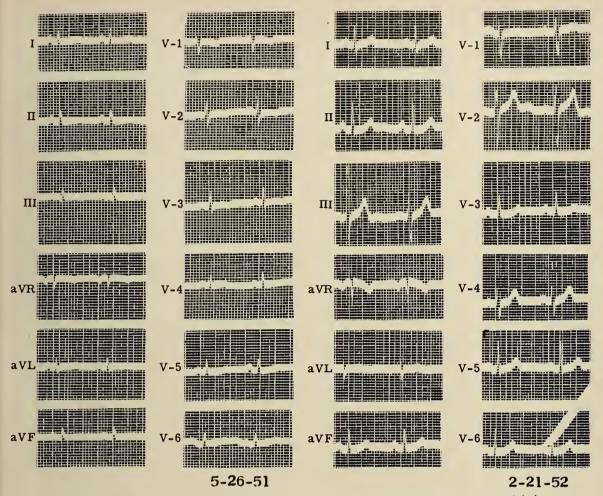


Fig. 5. Electrocardiograms of patient whose roentgenograms are shown in figure 4. The characteristic low voltage complexes were present on May 26, 1951, during the time of the large pericardiac effusion.

and the pleural space, and the patient's convalescence was satisfactory. A culture of the pericardiac tissue was negative and the histologic picture was nonspecific. The patient improved in general strength rapidly and has remained in good health. The electrocardiograms taken during the time of the pericardiac effusion (figure 5) are characterized by the low amplitude of the QRS complex and flattening of the T waves. Return of the electrocardiogram to normal after treatment is seen.

The etiologic background for the preceding

2 cases has remained obscure.

In regard to internal drainage of the pericardiac sac, an interesting case in which chylous pericarditis responded to a surgically produced pleural pericardiac "window" has been reported

by Groves and Effler.6

It has already been implied that pericardiac tapping is not a very satisfactory procedure for ruling out a pericardiac effusion or to obtain fluid or tissue for diagnosis. Angiocardiographic studies are of value in occasional cases, but my colleagues and I do not believe that these can be regarded as a routine type of investigation.

In some cases, as illustrated by the previous case, pericardiac exploration allows the best chance to reach a satisfactory solution. Another case to demonstrate the value of this surgical ap-

proach is the following:

A 36-year-old married woman had a difficult delivery of a stillborn baby in January, 1952. In February she experienced left pleuritic pain and chills and had a low-grade fever. This group of symptoms recurred in a mild way throughout the next year and in July, 1953, she noticed pain in the anterior portion of her chest synchronous with the heart beat. She continued in an ambulatory state until August, when she was hospitalized elsewhere and the pleural effusion was tapped. In September she registered at the Mayo Clinic, where the tentative diagnosis of nonspecific pericarditis with pleural and pericardiac effusion was made. The heart did not decrease in size and in December a pericardiac and pleural biopsy was advised. The report was metastatic adenocarcinoma. Site of primary tumor was not found.

Both secondary and primary neoplasm in the pericardium can show the transient phase of chest pain or pericardiac effusion suggesting an acute idiopathic pericarditis. Brandenburg and

Edwards<sup>7</sup> recently reported a primary sareoma of the heart that showed such a sequence. It would seem important that if the patient having the manifestations of an acute pericarditis does not regain his general health rapidly or the cardiac silhouette does not return to normal, then the more definite diagnostic procedure of pericardiac exploration is immediately worth while.

In constrictive pericardiac disease, the recent advance has been reported by Holman and Willett<sup>8</sup> that in those cases caused by tuberculosis, an immediate operation rather than delayed operation has been demonstrated to be a worthwhile procedure. Such a change has been made possible by the chemotherapeutic agents and antibiotics that are available for the mitigation of tuberculous infections, but still to be remembered is the fact that the risk in these tuberculous cases is higher than in the healed calcified pericardium.

In cases of constrictive pericarditis, it is important to note that cardiac catheterization data have settled controversies concerning the altered hemodynamics. Some authorities believed that constriction of the superior and inferior vena cava contributed to the picture and that surgical release of such supposed strictures was important in the treatment. To my knowledge, no one has found any gradient of pressure between the right atrium and the great veins entering it, and this is the best evidence against constriction in such areas playing a significant role. All the cases have some degree of pulmonary hypertension and the pulmonary capillary pressure shows some increase above the normal as measured by the wedged catheter. The latter indicates that there is an inflow stasis on the left side of the heart as well as on the right. This fact is consistent with the observation that sometimes the pulmonary venous distention can dominate the clinical picture by producing orthopnea. The contours of the recorded pressures in the right atrium and right ventricle obtained through the cardiac catheter are characteristic and may be of diagnostic importance in some instances. However, emphasis should be placed on the fact that other cases of heart failure may simulate the contour pattern, and Hetzel, Wood, and I<sup>9</sup> have described 1 case of amyloidosis of the heart in which such pressure contours were present.

#### SUMMARY

Acute pericarditis is often a relatively benign complication of illnesses wherein the exact etiologic agent is obscure, for example, the "virus" or "atypical" pneumonitis. While frequently associated with pleuritis, this condition may occur singly as a symptom complex and can be characterized by severe chest pain. Rheumatic fever in young adults should be suspected as the etiologic basis of acute pericarditis, but, if such is the case, other signs of rheumatic carditis usually become manifest. The sequence of historic events and electrocardiograms usually allow a definite diagnosis.

Chronic constrictive pericarditis should be recognized early and treated early by surgical excision of the constricting tissue. The cardiac silhouette may be small or large and in the early phase of disease, or, in a minority of cases, even of long duration; calcification is not demonstrable. Cardiac catheterization data have demonstrated that both sides of the heart are compromised and that pressure contours obtained from right ventricle and atrium may have diagnostic importance.

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## Emergency Management of Dislocations, Sprains, and Strains

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THE EMERGENCY treatment of dislocations, sprains, and strains is a phase of treatment which is generally overlooked in textbooks and first-aid manuals. The former deals with definitive methods of reduction and immobilization; the latter is designed primarily for laymen. These injuries are considered together in this paper because of their many similar features and because the general principles governing their initial treatment are the same.

A dislocation occurs when members of a joint are torn from their normal relationship and displaced in such a way that spontaneous return to the normal position is impossible. Dislocations are always accompanied by serious soft tissue injury. A sprain occurs when a joint is carried through an abnormal range of motion but returns to its normal position. The injury may vary in degree from simple stretching of the capsule to complete dislocation, spontaneously and instantaneously reduced. The damage to the articulation ranges from the very serious to the inconsequential. The crux of the matter is to estimate properly the degree of injury which has occurred. Strains are ruptures of muscles or their tendons which occur as a result of muscular violence. Like sprains, the amount of damage varies widely, from total separation of the muscle to the common charleyhorse. The common denominator in all of these injuries is the torn soft tissue with hemorrhage into the surrounding tissues.

Ligaments, tendons, and the joint capsule are not vascular structures. Bleeding is the result of tears in the muscle belly or through the vascular tissue underlying the synovial lining of the joint. Hemorrhage, if uncontrolled, may be considerable. Congestion of the region leads to impairment of the general venous return, and so to further swelling. This process surrounds the joint with a swollen boggy mass of exudate. The natural landmarks are obscured so that an ac-

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curate clinical appraisal of the degree of injury is difficult, if not impossible. The time to check this natural reaction to injury is during the period of emergency management. This can best be accomplished by: (1) limiting the damage to that caused by the injury; (2) restoring normal anatomic relationships without delay; (3) immobilizing the disabled member; (4) applying compression bandages; and (5) cooling the area of injury.

Prevent further injury! Simple injuries have frequently been complicated by overcnthusiastic first aiders, careless transport of the patient, and ill-advised activity. The patient should not be allowed to use the injured extremity until adequate examination has ruled out serious soft tissue or bone injury. Neglect of a minor injury may contribute directly to another more severe injury. This is especially true in all types of athletic pursuits. After any injury, the player should not be allowed to return to play until the inconsequential nature of the injury has been definitely established and then only after the application of protective strapping and support.

Dislocations should be reduced at the earliest possible moment. The greater the delay between dislocation and reduction, the greater the difficulty in reduction and the more frequent the danger of serious complications. Dislocations of the fingers can often be reduced on the playing field or in the locker room. Major dislocations must be reduced under heavy sedation or general anesthesia. All efforts to replace the dislocation must be carried out carefully so that further injury is not added to the primary trauma. Roentgenograms should be taken in every case of dislocation to be sure that a fracture is not overlooked. The early restoration of normal anatomic relationships relieves vascular embarrassment and muscle shortening. The former contributes to the local swelling; the latter, when permitted to persist, makes reduction of the dislocation very difficult.

The injured limb should be immobilized with the same care as if a fracture were present. Indeed, at the time of emergency management, it is impossible to tell whether or not a fracture is present complicating the injury. A great variety of methods can be used for effective immobilization. As a result, further injury is prevented, pain is relieved, and the formation of clots at the ends of the torn vessels is not disturbed by movement. The expedient of immobilization is elevation. The disabled limb should never be allowed to rest in a dependent position for this promotes swelling. Elevation limits swelling by providing a more efficient venous return.

The progress of the local bleeding after injury can be checked by compression. To be effective, however, it must be applied properly, avoiding constriction of the part and providing firm even pressure. The compression bandage should begin at the base of the fingers or toes and run proximally to a point above the injury. Failure to include the distal uninjured portion of the limb in the dressing may result in considerable edema due to the impairment of the venous return by the proximal constricting bandage. The dressing about the damaged joint should include a considerable amount of absorbent cotton or sheet wadding to provide a bulky compressible pad which spreads the pressure firmly and evenly, smoothing out any irregularities or wrinkles in the bandage. Such a large dressing helps to immobilize the joint. Nonelastic muslin bandages, while more difficult to apply, are more

effective in providing firm pressure than the common elastic bandages.

Cold applications are useful in limiting the amount of local hemorrhage because, as a result of the drop in local temperature, there is a pronounced decrease in the amount of blood circulating through the damaged area. This constriction of the vascular bed checks bleeding from the torn vessels. Cold also has analgesic properties. Throbbing pain may be completely relieved as the circulation is diminished. Dull aching pain can be reduced in intensity. The use of cold applications should be continued until after the immediate reaction to injury has subsided, usually for twelve to thirty-six hours. It should be remembered that patients with peripheral vascular disease must be observed most carefully for complications arising from the use of compression dressings and cold applications.

#### SUMMARY

The emergency treatment of dislocations, sprains, and strains should be directed toward minimizing the local reaction to injury. Swelling and hemorrhage about the damaged area can be minimized by prompt treatment, utilizing the principles previously discussed. Effective emergency treatment speeds convalescence by allowing early assessment of the degree of soft tissue damage and by providing optimum conditions for the initiation of the healing processes.

When other therapy fails, often superficial thrombophlebitis may be successfully treated by phenylbutazone (Butazolidin). Complete or partial subsidence of inflammation was observed within twenty-four to ninety-six hours in 50 cases, including phlebitis associated with varicosities, malignant disease, and thromboangiitis obliterans. Although toxic effects in the bone marrow, alimentary tract, or skin did not occur in any of the patients, Irwin D. Stein, M.D., of Columbia University and O. Alan Rose, M.D., of New York University, New York City, advise frequent blood and physical examinations to detect development of potentially dangerous and fatal reactions. Usually the drug is given for one week in a dosage of 200 mg. three times a day for three days, and then 200 mg. twice daily; the total amount is about 3 to 3.5 gm.

IRWIN D. STEIN, and O. ALAN ROSE: Arch. Int. Med. 93:899-905, 1954.

# Prevention of Death and Crippling from Kernicterus in Hemolytic Disease of the Newborn

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Kernicterus, the leading postpartum complication of hemolytic disease of the newborn and the cause of over half the deaths, is now believed to be not only preventable but, during its early stages, possibly reversible.

Exhaustive studies on the nature and the cause of kernicterus have been published in the past few decades. Orth,¹ as long ago as 1875, noted a yellow discoloration of the ganglia of the brain stem and cerebellum of patients who had had a clinical syndrome similar to erythroblastosis fetalis. In 1903 Schmorl² described the pathologic changes in the basal ganglia and introduced the term "kernicterus." As recently as 1938 Darrow³ suggested a serologic difference between adult and fetal hemoglobin as being fundamental in the pathogenesis of this syndrome. In 1941 discovery of the Rh factor by Landsteiner and Weiner proved the isoimmunization theory correct.

The postnatal development of kernicterus and the intimate nature of the changes that occur have been studied by many investigators. In a review of autopsy material, Becker and Vogel<sup>4</sup> determined that, although there is a focal distribution of yellow pigment in the nuclear masses as early as the second day of life, not until after this time can histologic evidence of nerve cell degeneration and glial proliferation be found. Day<sup>5</sup> has demonstrated by animal experiments that brain tissue must be damaged before it readily takes a vital dye such as bilirubin. The nature of the damage is apparently immaterial since mechanical injury, hypoxia, hypoglycemia, and x-ray treatment are equally effective in experimental animals. Other experiments have shown that when a young animal is flooded with dye, staining of the brain in these immature animals occurs at lower concentrations than in adult animals.6 However, the fact remains that,

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although some animals are capable of developing erythroblastosis, they never seem to suffer from kernicterus. Staining of the normal adult rat brain could not be demonstrated by Day until serum levels of 60 to 70-mg. per cent were reached. Such animals may convulse and die but their brain contains no intracellular pigment. Under these conditions, induced hypoglycemia results in histologic changes resembling human kernicterus.

According to Najjar, <sup>6</sup> bile tends to be absorbed on surfaces. He found that most of the pigment in the serum, as a result of hemolytic jaundice, is indirect in its reaction and similar in spectrophotometric pattern to globulin. <sup>7</sup> Hsia <sup>6</sup> cites cases in which the serum bilirubin was 40-mg, per cent or more but in which the indirect fraction never exceeded 25-mg, per cent. The fact that none of these cases developed kernicterus indirect fraction is more or less specific. Adams <sup>6</sup> suspects that liver dysfunction or some other end product of hemolysis may play an important role.

Najjar<sup>6</sup> has demonstrated that brain tissue depends on cytochrome systems containing heme for tissue respiration and suggests that, since bilirubin is similar to heme, it may compete for the protein linkages in the cytochrome systems and render them inactive for oxygen transfer. Day<sup>8</sup> found that bilirubin in concentrations greater than 20 to 25-mg. per cent depressed the respiration of the in vitro rat brain by 25 per cent. Cytochrome C reverses this inhibition. Methylene blue also accomplishes this reversal but at a much slower rate. These data all suggest that the cellular damage present in kernicterus is directly or indirectly related to bilirubin and that bilirubin must be incriminated as a toxic agent rather than vindicated as being a stain only. Although further study is necessary to finally establish this mechanism, experience supports the implication of hyperbilirubinemia.

It is now established that while anemia is the chief danger in fetal life and complications of anemia cause almost half of the deaths, kernicterus is a postpartum development and bilirubin is the pigment found in the damaged brain cells. 6.9,10 Controlled studies by Mollison and Walker<sup>11</sup> revealed the incidence of kernicterus to be five times greater in infants treated by early simple transfusion than in those treated by exchange transfusion. This suggests that persistent elevation of the serum bilirubin above a critical level permits kernicterus to develop.

Since the introduction of modern serologic technics, 179 cases of hemolytic disease of the newborn have been treated at Northwestern and University of Minnesota hospitals in Minneapolis. Table 1 demonstrates the pronounced difference in average peak serum bilirubin levels in the 2 groups of patients in our study. In those in whom kernicterus did not develop, an average peak scrum bilirubin level of 11.01-mg, per cent was found, while in those in whom kernicterus did develop, the average peak was 25.3-mg, per cent. No cases occurred with levels below 12-mg, per cent.

TABLE 1 179 CASES OF ERYTHROBLASTOSIS TREATED AT UNIVER-SITY OF MINNESOTA AND NORTHWESTERN HOSPITALS BETWEEN 1945 AND 1951.

1945-51	1951-54
113	66
17 (15.04%)	4 (6.06%)
25.0-mg.%	25.6-mg.%
10.81-mg.%	13.31-mg.%
36 (32.1%)	45 (68.1%)
	113 17 (15.04%) 25.0-mg.% 10.81-mg.%

Until recently hemolytic disease of the newborn was believed to be due almost entirely to Rh incompatibility. Hsia and associates<sup>12</sup> recently reported an unusually high incidence of A and B incompatibility in a small group of patients. Characteristic of the disease are: neonatal icterus, reticulocytosis, spherocytosis, anemia, an increased osmotic fragility of the erythrocytes, a variable Coomb's test, and a positive double Coomb's test. The criteria for the clinical diagnosis and treatment are the same as in other types of erythroblastosis fetalis.<sup>6</sup> Rosenfield suggests that A and B incompatibility is common but is usually subclinical and innocu-

ous. Other diseases, such as congenital familial nonhemolytic jaundice, may produce a markedly high scrum bilirubin and result in kernicterus.

Hsia and associates<sup>13</sup> have shown the mechanical fragility of normal erythrocytes to be decidedly increased at birth, with normal adult values being attained by the fifth or sixth day of life. The rate of fall correlated inversely with the rate of rise of the serum bilirubin.

The only method of treatment that has succecded in preventing kernicterus is exchange transfusion. Many claims have been made concerning the antibody neutralizing ability of Rh haptens. Almost an equal number of claims are opposed, although the supporting evidence is sometimes rather fragmentary. Rh hapten was given with careful obstetrical supervision at the Northwestern and the University of Minnesota hospitals between 1947 and 1952, and the results from the point of view of the occurrence of kernicterus and the mortality rate are tabulated in table 2. Most of the 32 mothers treated with this material were started on treatment early in pregnancy. Not only was the occurrence of kernicterus almost unaffected when compared to the occurrence in a control group, but the mortality rate was almost double. From this evidence it is almost conclusive that Rh hapten had no beneficial effect on the course of hemolytic disease among these newborns.

Various attempts at preventing or modifying hemolytic disease have been tried. Desensitization of the mother by repeated small injections of Rh positive blood is, of course, not only theoretically unsound but, if valid, repeated pregnancies with Rh positive fetuses would have a beneficial effect.

Induction of labor prior to thirty-eight weeks of gestation has proved unwise, as evidenced by the 50 per cent mortality rate in the prematures encountered early in our experience. Adreno-corticotropin and cortisone have been tried with the hope of preventing tissue reaction. Most observers have reported ACTH and cortisone to be of no value, although some feel that these hormones need further evaluation, since only inconclusive studies have been presented thus far. Although it seems logical that the ultimate solution of the isoimmunization problem will probably be found in maternal management, so far

TABLE 2 RESULTS OF TREATMENT WITH RH HAPTENS

	Total cases	Kernicterus	Mortality rate	Normal infants
Cases treated with Rh haptens	32	5 (15.6%)	6 (18.8%)	21 (65.6%)
Control cases	65	12 (18.4%)	7 (10.7%)	46 (69.9%)

TABLE 3 RESULTS OF THE USE OF EXCHANGE TRANSFUSION IN RICHARDSON HOUSE, BOSTON®

	1-1-45	11-1-46	4-1-49	7-1-51
	to 10-31-46	to 3-31-49	to 6-30-51	to 6-30-53
Exchange transfusion	0	36 (63%)	61 (90%)	38 (79%)
Kernicterus	6 (30%)	6 (10.5%)	0	0

Adapted from Allen, Fred H., Jr., and Diamond, Louis K., Prevention of kernicterus, J.A.M.A. 155:209, 1954.

the most successful results have been shown to be in treatment of the infant.

Exchange transfusion has proved to be effective in greatly reducing the incidence of kernicterus in all series reported. Authorities agree that the patient can be managed best in a medical center staffed by persons adequately trained in the special problems of the newborn. According to Mollison, Allen and others, cardiac failure associated with severe anemia, is the usual cause of death in the first few hours. Death from kernicterus without anemia, usually occurs in three to four days. Mollison, who studied cord hemoglobin values, showed the average normal to be 15.5 gm. per 100 cc. He compared the relative validity of a low cord hemoglobin versus a high cord serum bilirubin as an index for replacement of blood. He favors a low cord hemoglobin and regards any value below 15.0 gm., in the presence of a positive Coomb's test, as an indication for exchange. Our data tend to substantiate this, inasmuch as 75 per cent of the patients on whom an exchange transfusion was done had cord hemoglobins of 14.5 gm. or less.

Of 179 cases studied, 113 occurred before 1952 and 66 cases after that date (table 1). The pronounced reduction in the rate of occurrence of kernicterus from 15.04 per cent to 6.06 per cent seems to correlate well with the increased use of exchange transfusion and of serum bilirubin determinations as a guide in therapy. The average peak serum bilirubin concentration was markedly and constantly elevated in the patients who developed kernicterus in both groups, namely, in those who were treated between 1945

and 1951 and in those who have been treated since 1951. The 4 cases of kernicterus which occurred in the latter group were admitted from other hospitals after a lapse of twenty to thirtysix hours. These data agree well with those of Allen and Diamond, (table 3) who recently reported that in 200 cases of erythroblastosis, which they treated since 1948, they encountered no instance of clinical kernicterus.9

Experience to date indicates that a liberal attitude toward the use of exchange transfusion has appreciably reduced the incidence of kernicterus. Indeed, if cases of hemolytic disease of the newborn are treated promptly and adequately, clinical kernicterus is not a complication. From the studies reviewed and the experiences reported herein, it seems fair to state that:

1. Kernicterus due to hemolytic disease of the newborn (erythroblastosis) is a postnatal complication and almost the only cause of death after the first day of life.

2. The course of hemolytic disease of the newborn in 32 cases that were vigorously treated with Rh haptens was unaltered when compared to the course in 65 control cases.

3. Kernicterus is entirely preventable, if newborns, in whom the Coomb's test is positive and the cord hemoglobin is 14.5 gm. or less, are promptly exchange transfused. This procedure should be repeated if the serum bilirubin persists above 15 or 20-mg. per cent.

4. Steroid therapy appears to have been unsuccessful but has perhaps been inadequately evaluated. Eventually the isoimmunization problem may be solved by maternal management.

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### Proctologic Diagnosis

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IN PROCTOLOGY, as in every facet of general practice, nothing is of greater importance than diagnosis. This must be preceded by an understanding of the anatomy and physiology of the

affected parts.

Any discourse on proctologic diagnosis must begin with a knowledge of the anatomy and physiology of the colon and rectum. With a knowledge of the organs involved, the signs and symptoms that are presented when pathology develops can be understood. Nearly all of the signs and symptoms encountered in proctology can be explained on a change from the normal anatomy and physiology. The history of pain, bleeding, soreness, tenesmus, diarrhea, and constipation can all be explained on the anatomicphysiologic basis. Gabriel has stated, "A correct diagnosis of a rectal lesion can be made in the majority of cases by attention to the following points: (1) a careful investigation of the history, (2) complete rectal examination, (3) the necessity for re-examination in certain cases, and (4) special care in diagnosis of a doubtful condition.'

Briefly, let us review the anatomy of the perianal region. When the buttocks are spread apart, the anal verge is noted which is covered by squamous cell epithelium. The anal canal is approximately 3 cm. long from the verge to the rectum, forming the anorcctal line. There are 3 sets of very important muscles surrounding the anus and the lower rectum. The external sphincter, which is composed of the 3 bundles of voluntary muscle; the internal sphincter muscle, which is the terminal portion of the circularis muscle; and the levator ani muscle which acts as a support of the pelvic viscera, rectum, and anus. The rectum is approximately 15½ cm. in length covered by mucosa. Underneath is the circularis muscle and the longitudinal muscle fibers. There are 3 valves of Houston which are eccentrically located. The blood supply of the rectum and down to the anorectal line is the

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superior and midhemorrhoidal artery. The anal canal is supplied by the inferior hemorrhoidal artery. The venous drainage from the anal canal and the lower portion of the rectum is by the inferior and the midhemorrhoidal artery. This fact is important to remember because malignancies from this area metastasize into the lung by way of the inferior vena cava through the heart. The mid and upper portion of the rectum is drained by the superior hemorrhoidal vein which empties into the portal system. Therefore, the metastases of malignancy would be into the liver. There are 3 plexuses of veins above the anorectal line which are called the hemorrhoidal veins. When these veins become varicosed, they form the internal hemorrhoids. Varicosity of the inferior hemorrhoidal vein is the etiologic factor of the external hemorrhoids. The levator ani muscle, the coccygeus, and the piriformis muscle are important for support and occasionally give rise to rectal cramp. Thus, a patient may complain of severe rectal cramps. On digital examination, with pressure upon the affected muscle, the patient experiences severe pain which is frequently radiated to the coccyx. Frequently, the coccyx is blamed for this symptom and a coccygectomy is performed without relieving the symptoms. I am sure that most physicians have encountered this experience in their private prac-

At the juncture of the anus and rectum, squamous cell epithelium can be seen in the anal canal, and mucosa above in the rectum. From 8 to 12 crypts are present in this region which communicate to perirectal and perianal lymph nodes by way of small lymphatic vessels. When these crypts become infected, cryptitis develops which may then communicate up the lymphatic vessel to the lymph node, causing a rectal abscess or a perianal abscess. Cryptitis causes the symptom of tenesmus.

The lymphatic drainage from the anal canal at the verge is into the inguinal lymph nodes. Lymphatic drainage from the rectum, as well as the rectosigmoid, is into the lymphatics which

follow the inferior mesenteric vessels.

The perianal region and the anus have a very sensitive nerve supply. The pudendal nerve is

formed by the second, third, and fourth sacral nerves. Pain experienced in this area is pronounced. These nerves are carried, for a few cm., up the rectum where they terminate. This is the reason and is an explanation why a patient with a small fissure or an ulcer in the anal canal has severe pain, while lesions in the rectum proper may give symptoms of fullness, but no pain. Therefore, when a patient gives a history of severe anal pain or, as he says, "rectal pain," we know that pathology is in the anal canal.

The perirectal and perianal spaces are very important because of the formation of rectal abscesses. Below the levator ani muscles, on either side, is the ischiorectal space which is filled with fatty tissue. Above the levator muscle, but below the peritoneal fold and lateral to the rectum is the pelvirectal space. Posterior to the anus is the posterior anal space. The levator ani space is bound anteriorly by the transverse perineal muscle and fascia.

The colon and rectum is approximately 150 cm. in length, varying, of course, depending upon the height of the individual. The cecum has a short mesentery. The ascending colon is quite well fixed while the transverse colon has a fairly long mesentery. The descending colon is also fixed while the sigmoid colon has a long mesentery and is freely movable. Because of the mobility of the sigmoid, volvulus is found here most frequently. The cecum is the region in which this condition appears second in frequency.

The physiology of the colon may be described briefly as follows: If an imaginary line is dropped through the center of the abdomen, the colon will be divided into the right colon and the left colon. The principal physiologic function of the right colon is to absorb fluids and the primary function of the left colon is to retain the stool. As the stool enters the cecum, it is liquid in form. When it reaches the transverse colon, it is quite solid but not as solid as it becomes at the time of delivery. As it enters the sigmoid, the remaining fluid is absorbed with the result that the stool is formed when it is passed. This gives us the explanation why, in a bleeding lesion in the transverse or descending colon, the blood is mixed with the stool. If the lesion is low in the sigmoid or in the upper rectum, blood is noticed on the surface of the stool. If the lesion is low in the rectum, blood appears either on the surface of the stool or may be passed independently of the stool. Any interference with the absorption of fluids in the right colon produces the symptom of diarrhea. This may be due to carcinoma, ulcerative colitis, or any of the other colidites, or, if the fluid is rapidly passed from the right colon into the left colon as in the case of the irritable colon, the principal symptom may be diarrhea.

Let us now consider the history, which is all important. Why does the patient with a proctologic problem come to see the physician? The two most common complaints are pain and/or bleeding from the rectum. The next most frequent complaints may be pruritus, discharge, constipation, diarrhea, swelling, or some vague abdominal symptom. The statement has been made that in approximately 50 per cent of the cases, diagnosis may be made on history alone.

If the history is that of pain, inquiry must be made about its mode of onset, whether it occurs before and after stool, and whether it lasts for some period of time after discharge of the stool. If the pain is due to a fissure, it is severe at the time of stool and gradually subsides. If an external thrombosed hemorrhoid is the cause, swelling is present and the pain is varied, depending upon the pressure that is exerted upon the sensory nerves. If the pain is due to rectal abscess or anal abscess, it is well in character, gradually becoming more severe and has no relationship to the stool.

Rectal bleeding is one of the most important symptoms. It should never be taken lightly or disregarded, and, regardless of what pathology may be found in the anal canal or lower rectum, the presence of a benign or malignant polyp or tumor at a higher level must always be suspected. This is our golden opportunity for the prevention or early detection of cancer of the rectum in the sigmoid up to the 25 cm. level. That is the reason why proctosigmoidoscopic examination should be included in a general physical examination. The quantity of blood passed is not important. The important thing is the presence or absence of blood.

The technic of a good proctosigmoidoscopic examination is important. It must be approached with an intelligent understanding of the principles which have just been mentioned and a thorough knowledge of the affected part.

If the patient complains of severe pain, instillation of a local anesthetic such as 5 per cent cocaine gives relief.

We carry out 4 procedures in the proctosigmoidoscopic examination after the history has been taken: (1) inspection of the perianal region, (2) digital examination, (3) proctoscopic examination, and (4) sigmoidoscopic examination. These procedures should be followed, whenever indicated, by a barium enema roentgenogram, also by inspection into the condition of the perianal skin fistula openings, swellings, discharges, external hemorrhoids, sentinel tags, and so forth.

The digital examination consists of more than merely placing the finger in the anus. The character of the sphincter muscle tone must be determined whether or not pain and muscle spasm can be elicited, defects in the anal canal, and swellings. In the male, the prostate gland and the levator muscles must be examined. The levator muscles must be examined for muscle spasm and pain. The surface of the mucosa must be carefully examined for tumors. As the finger is removed from the anal canal, it should always be examined for the presence of blood.

The proctoscopic examination is next. The patient should be examined in all 4 quadrants; lower rectum and the condition of the mucosa, whether ulcerated or not, the presence of tumors, hypertrophic papillae, anal fissures or ulcers, the condition of the crypts, and the presence of transparent transparents to the small small state.

ence of tumors in the anal canal.

The sigmoidoscopic examination is then performed, the scope being carefully passed by the sphincter muscle, at which time the obturator must be removed, and then under direct visualization the scope is advanced up to the 25-cm. level. Careful note must be made of the rectal mucosa for tumors and mucus and whether or not the mucus contains blood. We have been suspicious of polyps above the 25-cm. level when blood-tinged mucus is found. This finding has always been substantiated by the barium enema roentgenogram. I believe it is well to examine the patient before and after an enema is given. The ideal procedure is to examine the patient at the office before an enema, noting the character of the stool, whether blood is present or not, and then follow with an enema after which the sigmoidoscopic examination is performed.

If a satisfactory explanation cannot be given for the signs and symptoms which the patient presents at this time, a careful roentgenologic

examination should always follow.

Let us now, in more anatomic order, look at

the more common pathologic problems.

The lesions found most often about the perianal region are: external, thrombosed hemorrhoids; prolapsing papillae; lipomas of the perianal region; condylomata acuminata; hidradenitis suppurativa; pruritus ani; perianal abscesses; the sentinel tag of the anal ulcer or fissure; the tuberculous ulcer; the malignant epithelioma; and squamous cell carcinoma.

Lesions in the rectum and rectosigmoid are: internal hemorrhoids, whose common symptom

is that of bleeding protrusion and prolapse; the nonprolapsing hypertrophic papillae; rectal abscesses; the very important benign polyp; and the malignant polyp or carcinoma. The internal hemorrhoid is easily identified. It is reddish to light blue in color and bleeds easily by slight trauma. Another rather common problem is that of prolapse of rectal mucosa and procidentia. In procidentia, the muscular walls with the mucosa prolapse and form annular rings in the prolapsing tissue. Prolapse of the rectal mucosa is smooth and may include one wall or may be annular.

Time does not permit discussion or consideration of the different colidites, but it is extremely important to spend a few minutes with the be-

nign and malignant polyp.

Every practicing physician is aware of the cancer problem. Prevention of the disease is one of our functions as physicians, and can be accomplished in the rectum and colon. The principles which must be followed in the attack of carcinoma are: (1) prevention of the disease, (2) carly detection, and (3) adequate treatment.

This is one part of the human anatomy where prevention of carcinoma is possible because all benign polyps are universally accepted as potentially malignant. Therefore, these polyps must be found before they do become malignant, and adequately treated to prevent malignancies from developing. It is interesting to note that approximately 75 per cent of all of benign and malignant polyps develop within the last 25 cm. of the intestinal tract. The signs and symptoms of the benign and malignant polyp or carcinoma vary. The small lesion seldom has any symptoms or signs whatsoever. These lesions can be found only by including the proctosigmoidoscopic examination in the routine examinations. If a change of bowel habit, rectal bleeding, bloodtinged mucus, or diarrhea occurs, diligent examination is mandatory. If necessary, re-examination must be done. If pathology is found in the anal canal or in the lower rectum which explains the symptom of bleeding, it is still mandatory that the entire large bowel and rectum be examined for the possibility of carcinoma.

In summary, let me emphasize again the principle set down by Gabriel: a careful history, a complete rectal examination, the necessity of re-examination if all signs and symptoms cannot be satisfied, and, above all, keep in mind the possibility that more than one pathologic problem

may be present at the same time.

## Acid-Peptic Ulceration in Schizophrenic Patients During Histamine Treatment\*

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Reports have appeared that describe the use of histamine in the treatment of selected cases of schizophrenia. Some articles have claimed a rather startling efficacy for histamine

in the treatment of schizophrenia.1

Schizophrenia is truly a major scourge. In this country, there are more than 400,000 institutionalized schizophrenics. In general, young people are afflicted and of these a high percentage are doomed to a lifetime of mental illness. Of necessity, they become wards of the government and, because of their numbers, a tremendous burden upon productive society.

Therefore, any method of therapy that holds forth promise of effectiveness should be investigated vigorously, for truly, progress in treating this disease has been slight and it remains a

massive social problem.

Histamine has strong vasodilatory effects, which, theoretically at least, might influence the cerebral cortex in a beneficial way in some schizophrenic states. Histamine, of course, causes many undesirable side effects, such as lowered blood pressure and gastric hyperchlorhydria. In the light of previous reports, it was considered desirable to attempt to study the effect of histamine administration on a few schizophrenic patients. Moreover, Code and Varco² have devised a method by which a fairly even liberation of administered histamine can be obtained over long periods of time.

#### METHOD

A. Aqueous histamine by intramuscular injection. Of the 10 patients selected, none were expected to recover spontaneously. All but 1 had previously had some form of intensive treatment. Permission was obtained from their guardians for this investigation (table 1).

These patients were screened for such condi-

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tions as asthma, allergy, hypertension, cardiac pathology, peptic ulcer, and emphysema. Psychometric studies were made of each patient. Electroencephalograms were obtained in certain instances. The gastric acidity of each patient was determined after the administration of 0.5 mg. of histamine phosphate.

Histamine phosphate was then given intramuscularly to 10 patients twice daily for twenty-four consecutive days. The largest daily dose of histamine base used was 2.0 mg. (table 2).

The patients ate three times daily, and were watched to see that they did eat. They were weighed at intervals. Their hemoglobin was obtained weekly. The blood pressures of each patient were taken every two minutes for thirty minutes at each increase in histamine dosage. Electroencephalograms of some of the patients were obtained at intervals during this period. B. Histamine-beeswax by intramuscular injec-

B. Histamine-beeswax by intramuscular injection. Five weeks after completion of the above therapy, 7 of these patients were selected for further study. A single, intramuscular injection of histamine dihydrochloride in a beeswax-mineral oil mixture was given to these 7 patients on consecutive days. The dose was progressively increased. This mixture was made according to the formula of Code and Varco, and contained approximately 15 mg. of histamine base per 0.1 cc. mixture (table 3).

Tuberculin syringes and 20-gauge hypodermic needles were used. The extensor muscles of the forearm were the usual site of injection. Blood pressures were taken for thirty minutes in each patient until familiarity with the method was considered adequate. Meals, weights, and hemoglobins were followed as previously described.

#### RESULTS

The mental status of these patients did not change adjudged in the light of psychiatric evaluation by the staff of the hospital.

No harmful erosive effect on the gastrointes-

<sup>&</sup>lt;sup>o</sup>From the Hastings Mental Hospital and the department of surgery, University of Minnesota.

Patient	Age	Weight	Diagnosis	Date of Commitment	Previous Therapy	Free	Total
Н. В.	35	158	Schizophrenia, paranoid	6-21-45	Insulin shock, electro- shock, lobotomy	65	87
W. B.	33	170	Schizophrenia, catatonic	7-12-39	Metrazol, electroshock, lobotomy	53	80
S. C.	41	150	Schizophrenia, mixed	9-23-42	Electroshock	13	35
G. E.	44	115	Schizophrenia, hebephrenic	2-27-39	Insulin	45	68
Е. Н.	42	181	Schizophrenia, simple	9-14-43	Lobotomy	22	40
G. F.	42	150	Schizophrenia	8-31-31	None	11	34
R. L.	40	108	Schizophrenia	11-20-34	Insulin	48	78
G. S.	34	134	Schizophrenia, hebephrenic	3-28-36	Insulin, metrazol, electro- shock, lobotomy	32	70
E. W.	33	160	Schizophrenia	6-21-39	Insulin	55	86
R. W.	26	152	Schizophrenia, paranoid	6-8-42	Insulin, electroshock, lobotomy	32	46

tinal tract was noted from the use of intermittent injections of histamine in aqueous solution. On the basis of previous animal experiments, such effects would not be expected if meals were eaten regualrly.<sup>3</sup> A few, possibly fortuitous, cases of peptic ulcer occurring concomitantly with injections of aqueous histamine in patients have been reported.<sup>4</sup> On the other hand, more than 15,000 injections have been given by one group in the treatment of schizophrenia without any clinically recognizable effect on the gastrointestinal mucosa.<sup>1</sup> No significant changes in the hemoglobin, weights, or electroencephalograms were noted by us.

In the histamine-beeswax series, no significant change occurred in the electroencephalogram, hemoglobin, or weight determinations. The mental status of these patients was not influenced in any manner detectable by methods employed in this study. Patient R. L. developed shock and bronchospasm on the ninth day after receiving 15 mg. of histamine base. Further injections in his case were then discontinued.

Of the 7 patients to whom the histamine in beeswax-mineral oil mixture was given, 2 developed a peptic ulcer. Roentgenograms taken of R. L. two weeks after discontinuing his injections and after three days of suggestive symptoms disclosed a large posterior duodenal ulcer. Patient W. B. sustained a perforated anterior duodenal ulcer, which occurred after eighteen consecutive days of histamine in beeswax. The perforation was closed and patient recovered uneventfully.

Roentgenograms of the other patients taken at completion of this series failed to show any

TABLE 2
INTRAMUSCULAR DOSE OF AQUEOUS HISTAMINE BASE IN MG.

Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
A.M.	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
P.M.	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

TABLE  $\,3\,$  intramuscular dose of histamine base in Beeswax in Mg.

Patient	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
R. L.	12	6	6	6	7.5	7.5	10	10	15				— D i	s c o r	tinı	ıed -				− U°
Н. В.	12	6	6	6	12	15	15	15	20	20	20	20	22	20	20	20	22	22	0	20
W. B.	9	6	6	6	7.5	7.5	15	15	20	20	20	20	20	22	20	20	22	28	0	P†
S. C.	6	6	6	6	7.5	10.5	15	15	20	20	20	20	22	20	20	24	20	24	0	20
G. E.	6	6	6	6	10.5	15	15	15	20	20	20	20	20	20	20	20	22	22	0	20
G. S.	9	6	6	6	10.5	15	15	15	20	20	20	20	20	20	20	20	20	24	0	20
E. W.	6	0	0	0	15	15	15	15	20	20	20	20	20	20	22	20	22	22	0	20

<sup>°</sup>U—symptoms of peptic ulcer †P—perforation of ulcer

evidence of acid-peptic ulceration in the gastroduodenal area.

#### DISCUSSION

Shock therapy for schizophrenia is empirical in nature whether insulin, electricity, or other modalities are used. The ability of histamine when injected to produce shock first directed the attention of psychiatrists to this drug in the treatment of schizophrenia.

The amount of histamine in aqueous solution given by us was not as large as has been recommended by some who state that the dose schedule should be increased until the diastolic pressure falls to zero. On only 1 occasion, even with 2.0 mg. of histamine base, did the diastolic pressure of any patient in this series fall to zero. Schizophrenic patients, for reasons unexplained, seem to have a much greater tolerance to histamine than nonpsychotic individuals.

It was postulated that if improvement of the mental status of schizophrenic patients had been obtained by others from the transient physiologic effect of aqueous histamine, possibly such beneficial effect would be greater if a continuous stimulus was provided over a period of days and even weeks by a continuous release of histamine. Histamine-beeswax mixtures when injected intramuscularly have been shown in dogs to provide a constant stimulus, using gastric secretion as an index of stimulation, for at least twentyfour-hour periods. Because of this latter work, the erosive effect of histamine administered in this manner on the juxtagastric mucosa of the alimentary tract was known. Nevertheless, it was believed justifiable to use histamine in this medium so that the effect of prolonged histamine release on patients with schizophrenia might be observed. However, because of the potential danger of acid-peptic ulcerations, the study was set up in such a way that this occurrence would not be overlooked. It was decided not to vary the usual diet of these patients so that the hazard, if any, of this mode of histamine administration might be more accurately determined. It is altogether possible that a Sippy

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diet might afford protection against these erosive complications, for such has previously been ob-

served in laboratory animals.5

Probably peptic ulceration would have developed in all the patients had the histamine-beeswax been continued. In the series reported by Hay and associates,6 acid-peptic ulceration occurred in dogs between four to thirty-seven days. From this study, the human being would appear to be more susceptible to acid-peptic ulceration than the dog. The dosage used in the animal experimentation by Hay and associates was 30 mg. of histamine base. In these schizophrenic patients with a much greater body weight, the dose averaged 15 mg., that is, about % as much per unit of weight.

The fall in blood pressure after injection of the histamine-beeswax mixture was usually less than occurs following the injection of 0.5 mg. of histamine base in aqueous solution. Nevertheless, all the beeswax injections were given in the forearm or lower leg so that a tourniquet could be applied if it were found necessary to preclude further absorption of histamine from the beeswax. This proved very helpful during an anaphylactoid reaction sustained by patient R. L.

Another undesirable side effect which should be mentioned was the occurrence of areas of induration at the site of the administered histamine-in-beeswax. Two years after the last injection, no evidence of myositis at the site of the injections was noted. Extensive use of beeswaxmineral oil mixtures might, however, lead to the development of paraffinomas.

#### SUMMARY

1. Histamine given for a limited period either in aqueous solution or in beeswax mixtures did not improve the mental status of severely and chronically ill schizophrenic patients.

2. Histamine in beeswax causes acid-peptic ulceration in human beings. Apparently the human stomach is more susceptible to this occur-

rence than is the dog's stomach.

Histamine dihydrochloride provided through courtesy of Hoffmann-La Roche, Inc.

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### Charles E. Cotton

Pioneer and Leader in Tuberculosis Eradication

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N APRIL 21, 1954, one of America's outstand-On APRIL 21, 1994, one of American ing benefactors of health died. He was Charles E. Cotton who was born in Prescott, Wisconsin, September 18, 1871. He graduated from the Prescott high school in 1888 and entered the University of Minnesota School of Medicine in 1889. After completing the first year he decided to take veterinary medicine and enrolled at the University of Pennsylvania, where he received the degree of Doctor of Veterinary Medicine in 1893. He was awarded the J. B. Lippincott prize for having attained the highest scholastic standing in his class. After serving a year as house surgeon in the veterinary hospital, University of Pennsylvania, he established a general veterinary practice and conducted a hospital. As part-time city veterinarian from 1895 to 1901, he contributed significantly to the health of Minneapolitans. Through his effort, combined with that of the Board of Trade and the State Board of Health, Minneapolis adopted the first ordinance in the world regulating the production of milk within the limits of the municipality in 1895. When the State Livestock Sanitary Board was established in 1903, he was appointed as 1 of 5 members. Shortly after the United States entered World War I, he was commissioned major in the veterinary corps and assigned to the Surgeon General's office in Washington. He was then appointed as 1 of 5 general veterinary inspectors by the Surgeon General and devoted his time to this work until discharge in 1919. In 1929 he received a commission as lieutenant colonel in the veterinary corps of the Officer's Reserve.

Dr. Cotton's interest in tuberculosis began while he was a student in 1892 when, with his professor, Leonard Pearson, he administered the first tuberculin tests to cattle in the United States. This was done on March 3, on a herd of about 80 cattle near Philadelphia. Of these, 30 animals reacted and postmortem examinations revealed tuberculous lesions in all of them, although they apparently had been in normal health. This and subsequent work convinced Dr. Cotton and others that a test was now available which would detect the presence of tubercle bacilli in cattle. In the one hundred and thirty years which had elapsed since establishment of the world's first veterinary school in Lyons, France, no progress had been made in the control of tuberculosis among cattle because all the work had been done on manifestly tuberculous animals. Now, for the first time in history, a test was available that would permit the veterinarian to attack the tubercle bacillus rather than just the gross disease it produces.

Promptly after establishing himself in Minneapolis, Dr. Cotton was employed by the Minnesota State Health Department to administer tuberculin tests to cattle in the vicinity of Minneapolis. This was the first city in the United States to institute such a program. Concerning this, Henderson of Chicago said, "Minneapolis has taken a creditable stand in this matter. The city furnishes tuberculin free and a competent veterinarian to do the work. No man can legally sell milk without a license and a certificate of tuberculin tests must be presented before

a license may be granted."

In 1903, the herd of Chapin R. Bracket, near Minneapolis, was officially accredited as a modified tuberculosis-free herd. This was the first herd to be so accredited in the United States.

The tuberculin testing program was promptly adopted by the St. Paul and Duluth areas in an attempt to protect the citizenry against the bovine type of tubercle bacillus. Then smaller cities began to demand such protection by enacting ordinances compelling herd owners to have their cows tested.

An early activity of the State Livestock Sanitary Board, of which Dr. Cotton was continuously a member, was the promotion of annual tuberculin testing of purebred herds throughout the state. In 1916 provision was made to issue certificates to owners which designated them as accredited tuberculosis-free herds. These certificates were renewed annually. Minnesota ranked the highest of any state in the nation for the health and breeding qualities of her purebred herds. This reputation was nationwide and enjoyed favorable mention in foreign countries. Cattle breeders from outside the state were so desirous of procuring tuberculosis-free stock from this area that the demand exceeded the supply.

When Dr. Cotton was elected executive secretary of the State Livestock Sanitary Board in 1919 he called attention to the heavy demand for purebred dairy and beef cattle and stated that many buyers from other states and foreign countries had come to Minnesota to select their seed cattle for the foundation of new herds. He pointed out that 1 Holstein animal was sold for \$65,000 and a Minnesota breeder of Herefords paid \$50,000 for a single animal.

Despite much opposition to the program, informed owners everywhere saw the tuberculin test as the only method of keeping herds free from tuberculosis. Demand for testing grew to such an extent that local veterinarians were unable to cope with the situation, and in 1920 the Livestock Sanitary Board began to furnish field veterinarians for the testing of certain herds. By 1924, 11 such veterinarians were at work. The program was so effective and the demand of owners so great that in 1923, in cooperation with the United States Bureau of Animal Industry, it was decided to place tuberculin testing of cattle on a countywide basis. When complete testing of all cattle in a county resulted in a reaction of 0.5 of 1 per cent or less, the county was classified as a modified accredited tuberculosis-free area and was issued an official certificate. Animals found to react to the test were immediately removed from the herds. Thereafter no cattle could be brought into the county unless they were nonreactors to tuberculin.

Meeker County was the first in the state to adopt this plan. On May 8, 1923, qualifications were met and on May 12, 1925, the accreditation certificate was issued. This work progressed throughout the state so that the last of the 87 counties was accredited on December 1, 1934; thus, the entire state was officially designated a modified accredited tuberculosis-free area. This was one of the happiest moments in Dr. Cotton's life as it was the realization of a vision he had cherished since the 1890's. Although this was a goal that he and his allies had long strived to attain, it did not mean that tubercle bacilli had been eradicated from the cattle herds, since 0.5 per cent tuberculin reactors was permissible for county accreditation. Therefore, periodic tuberculin testing was continued with eradication of the bacillus as the final goal.

The road leading to the accreditation goal was rough, rocky, and strewn with many thorns. Only a man with the knowledge, vision, character, patience, courage, and numerous other excellent qualities which Dr. Cotton possessed could have traveled it so quickly.

After Minnesota was designated a modified accredited tuberculosis-free area in 1934, Dr. Cotton continued at the helm as executive secretary of the State Livestock Sanitary Board until his retirement in 1942. During the 23 years he served in this capacity, in addition to the large volume of work he had done ever since administering the first tuberculin tests to cattle in the nation, he became recognized as one of the great leaders of his time. By no means was his work limited to tuberculosis. He displayed uncanny vision and judgment in diagnosis, treatment, and control of the various animal diseases, particularly those transmissible to people such as rabies and brucellosis.

His great value was recognized at home and abroad. He was president of the Twin Cities Veterinarians' Association in 1907, Minnesota State Veterinary Medical Society in 1908, secretary of the United States Livestock Sanitary Association in 1908, and president in 1909. He was a member of the International Commission on Bovine Tuberculosis from 1919 to 1936. He was appointed to membership and later became chairman of the Committee on Tuberculosis of the United State Livestock Sanitary Association from 1921 to 1934, and worked in a similar capacity with the American Veterinary Medical Association from 1922 to 1933. He was a member of the Minnesota Trudeau Society. In 1935 the Minnesota Public Health Association arranged for a fine celebration in his honor and acclaimed him "Pioneer leader in the campaign to eradicate tuberculosis in cattle; public health statesman and educator; contributor to the protection of humanity," and elected him to life membership. In 1952, at an appropriate meeting of the American Veterinary Medical Association, Dr. Cotton was awarded the 12th International Veterinary Congress Prize.

Dr. Cotton observed early that tuberculosis is a disease which does not result in immunity for its host. Therefore, he recognized the futility of attempts to produce immunizing agents. He watched the dozens of such agents that came into existence and saw each one fail, including Bacillus Calmette Guerin. He had little patience with persons who became fanatic over what they thought was the possibility of immunizing animals against tuberculosis. He was in full agreement with his profession when

in the early 1930's all hope of producing immunity in cattle was abandoned.

Charles Cotton had unlimited courage of his convictions. An associate once remarked, "It would take more than the devil to scare Charlie Cotton or to cause him to retrench in the slightest from promoting any activity he thought was right." After the first tuberculin testing of all cattle in Mceker County was completed and retesting of the infected herds was begun, the opposition organized and succeeded in having an injunction served by 142 farmers which was so worded that it applied anywhere in the state. The majority of the cattle owners signed an intervening proposition under Dr. Cotton's direction. The decision of the district court was in favor of the majority. The case was retried with a second similar decision. It was then appealed to the United States Supreme Court which ruled that it was a police and health measure and hence a state and local question rather than a federal one. Concerning this Dr. Cotton wrote, "The trouble in Minnesota and in other states is being investigated by the American Medical Liberty League and subsidiary organizations, and the gratifying feature is that associated with them are the antivivisectionists and all of the religious cults, chiropractors, a few physicians, and everybody who does not believe in modern preventive medicine. They condemn the use of diphtheria antitoxin; they go into the legislative bodies and condemn the compulsory vaccination of school children and, because of the fact that they condemn everything in modern medicine, is a pretty good argument for us to use in support of tuberculosis eradication." He was a forceful speaker and a prolific writer.

He related to me a situation which occurred in another county when a group of irate, uninformed or misinformed cattle owners threatened him with lynching if he proceeded with the tuberculin testing program in their county. He also told of several threats upon his life by misinformed dog lovers when quarantine of all dogs was enforced because of the appearance of rabies in certain areas. To all such threats he calmly replied that the law would be enforced wherever and whenever the health and lives of people were endangered from animals with contagious diseases:

Unfortunately, a considerable number of physicians, who failed to understand the problem, opposed the veterinarians' tuberculosis eradication program during the first two or three decades of this century. Fortunately, a few, including Charles H. Mayo, D. C. Lochead, S. A. Slater, and L. S. Jordan, recognized the soundness of the program and campaigned actively in its support.

Dr. Cotton was an excellent psychologist. In 1928 he called me on the telephone and arranged for a conference. A year before I had published some scathing statements about veterinarians slaughtering so many apparently normal cattle only because they reacted to tuberculin. During our conference Dr. Cotton did not mention this although it was later

learned that he had previously read it. He only talked about the veterinarians' program and pointed out that every animal which reacted to tuberculin harbors tubercle bacilli containing lesions as had been demonstrated by an immense postmortem experience. He also emphasized that it is only tuberculin reactors which develop clinical and contagious tuberculosis. Therefore, the only way to solve the problem is to remove all tuberculin reactors from the herds and protect the uninfected against subscquent infection. He presented such a large volume of convincing information that no doubt remained about the validity of the veterinarians' eradication program. From that time on we were staunch friends. On a number of occasions, when Dr. Cotton was instrumental in having me invited to present papers before local and national organizations, I took advantage of the opportunity to publicly apologize for the earlier attacks on their program which admittedly were due to lack of information.

In the late 1940's, while preparing a brief historic sketch of tuberculosis in Minnesota, Dr. Cotton granted me several personal conferences. He had information which no other living person possessed. On one occasion he spent several hours with me and several times he devoted long periods to searching the old records in his former St. Paul office checking dates, accuracy of statements, and so forth. He then wrote a large number of pages in longhand containing valuable information.

The phenomenal result of the veterinarians' eradication program has never been rivaled in any major nation. Testing among the 93,000,000 cattle of this country in 1953 revealed only about 1 reactor in 1,000 animals. The state in which Dr. Cotton labored so hard and so long had only 1 in 5,000, and in the Minnesota county where he did the first testing in this state in 1894, only 1 of the 45,000 animals reacted to tuberculin in 1953. In 1917, from a total of 9,276,049 cattle slaughtered under federal inspection in the United States, 40,746 were condemned as inedible because of tuberculosis, whereas in 1953, among 15,204,998, only 391 were so condemned.

From his earliest work Dr. Cotton recognized how easily tuberculosis among cattle is transmitted to people. In fact, he placed the saving of human health and life far above the economic accomplishment that was sure to accrue in the eradication program.

Typing of tubercle bacilli has shown that in some parts of the world where tuberculosis among cattle has not been well controlled, 50 to 65 per cent of clinical tuberculosis of the skin and peripheral lymph nodes among people is due to the bovine type of tubercle bacillus. About 20 per cent of the lesions of the genitourinary system and of the bones and joints, and from 1 to 6 per cent of pulmonary tuberculosis are caused by bovine type of bacilli. In fact, about 25 per cent of fatal meningitis and generalized miliary tuberculosis are due to the bovine type.

As the veterinarians' tuberculosis eradication pro-

gram progressed, a corresponding decrease occurred in tuberculosis mortality, morbidity, and infection attack rates among people. Unquestionably a part of this was due to the control measures consisting of adequate sanatorium bed capacity and the excellent diagnostic work of the medical profession, but no doubt remains that the veterinarians removed a large block of tuberculosis from our citizenry.

In 1949, Dr. C. C. Chatterton, chief of medical staff, Gillette State Hospital for Crippled Children, wrote, "Tuberculosis in the good old days was approximately 50 per cent of the population of the hospital. At present it is down to approximately 5 per cent. It began to disappear slowly after testing of cattle became compulsory in this state and also associated with this, I believe, was the pasteurization of milk in the city." In 1953 only 0.9 per cent of the children in this hospital had tuberculosis of bones and joints.

In 1916, among children from birth to 15 years in Minnesota, 275 died from tuberculosis, and among those from 10 to 19 years, 268 died. In 1953, when the state had a larger population, there were only 7 deaths from tuberculosis among persons from birth to 19 years. In fact, no death occurred among those from the ages of 15 to 19 years, and only 1 in the

20- to 24-year-old group.

In this state there has been a corresponding decrease in morbidity and infection attack rates. In 1916, Dr. J. P. Sedgwick, chief, department of pediatrics, University of Minnesota, stated that 4 per cent of the children in this area were infected with tubercle bacilli during the first year of life and 70 per cent during the first 14 years. Now, in the same city, only 4 per cent of the children of grade school age are infected. Throughout the state the incidence of infected grade school children is approximately 2 per cent and in a large number of schools no child has been infected.

Upon retirement in 1942, Dr. Cotton was unani-

mously elected executive officer emeritus of the Livestock Sanitary Board. Dr. Ralph L. West, then engaged in private veterinary practice, became his successor. Throughout the years Dr. West has conducted the work of this board in an admirable manner, continuing most of the policies which were in vogue during Dr. Cotton's administration. Despite the low incidence of infected cattle, periodic testing of the 3,000,000 animals of this state has continued, and it is Dr. West's firm conviction that this must go on as long as 1 infected animal remains in the state.

In 1894 Dr. Cotton married Miss May Malin, Cleveland, Ohio. They reared 5 children: Mrs. Margaret C. Turner, Washington; Edith M. Cotton, Rushton, Louisiana; Grace H. Cotton, Minneapolis; Mrs. Jean C. Carroll, with whom he lived in Minne-

apolis; and John C. Cotton, Oregon.

After retirement, Dr. Cotton spent considerable time at Prescott, Wisconsin, where he was born and where his father had practiced medicine from 1867 to 1924. He deplored the thought of leading an inactive life so he accepted the chairmanship of the State Committee, United States Procurement and Assignment Service, Veterinarian Division, and compiled an adequate working list of veterinarians in Minnesota which he made available to the Armed Services. His mind remained alert and active. In March 1954, a hip fracture necessitated hospitalization, and he died four weeks later.

How fortunate it is that Charles Cotton was permitted to live to April 21, 1954, to be aware of the results of his great effort over so many years. In the later years of his life, judging from facial expressions and conversational enthusiasm, nothing gave him as much pleasure and satisfaction as reports of the phenomenal decrease in tuberculosis among animals and people. No single resident of Minnesota in this century has contributed more to the prevention of disease among our people than Charles Cotton.

When Dionosil Aqueous is used as the contrast medium, bronchograms show uniform mucosal coating and demonstrate the small peripheral bronchi. Although the substance has low viscosity, Charles M. Norris, M.D., and Herbert M. Stauffer, M.D., of Temple University, Philadelphia, find that alveolar filling is slight so fluoroscopic observation need not be hurried. The compound, a 50 per cent suspension of the n-propyl ester of 3:5 di-iodopyridone acetic acid with sodium carboxymethylcellulose as the viscosifying agent, is nonirritating and has little toxicity.

CHARLES M. NORRIS, and HERBERT M. STAUFFER: Ann. Otol., Rhin. & Laryng. 63:520-531, 1954.



This department of The Journal-Lancet is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.

## Nonclostridial Gangrenous Cellulitis of the Abdominal Wall\*

WALTER S. NEFF, M.D., HARRISON E. LAW, M.D., AND HAROLD H. JOFFE, M.D.

Virginia, Minnesota

The clinical picture of gas gangrene cellulitis produced by the clostridial group of organisms is familiar. The symbiosis or synergism of two or more nonclostridial organisms which may produce a crepitant gangrenous cellulitis has been reported as a definite clinical entity.<sup>1-11</sup>

The clinical features consist of a rapidly spreading cellulitis with or without crepitation, severe toxemia, and death if not recognized early and treated adequately.<sup>3,11</sup> The purpose of this paper is to report a fatal case of necrotizing cellulitis of the abdominal wall in a diabetic patient due to aerobic hemolytic Staphylococcus aureus. The clinical picture was identical with some of the reported cases of symbiotic or synergistic gangrenous cellulitis.

#### CASE REPORT

A 63-year-old white female was admitted to this hospital on July 4, 1953 with the complaint of abdominal pain. She had been a poorly regulated diabetic until four months prior to admission. She had worked rather hard in the garden on July 3, 1953, and was awakened at 5:00 a.m. on July 4, about seven hours before admission, with severe and fairly constant right lower quadrant and right midabdominal pain. The pain persisted and was accompanied by 5 to 6 episodes of nonbloody vomiting. There was no history of blood in the stools or urine

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and no urinary frequency. The family history was noncontributory. The past medical history revealed some pelvic surgery, the exact nature of which is

not known, and an appendectomy.

Physical examination revealed a very obese white female complaining of severe right midabdominal pain. The facies were flushed and the temperature was 99° F. The patient was hyperventilating and unusually apprehensive, with a respiratory rate of 20 and a pulse rate of 80 per minute. There was no lymphadenopathy. The heart was normal in size with a normal rate and rhythm and no murmurs. The blood pressure was 170/90. The lungs were clear. The abdomen was moderately distended with tenderness on deep pressure and rebound tenderness on the entire right side. There was definite dullness on the right side of the abdomen extending down to the level of McBurney's point. Rectal examination revealed nothing of note. There were bilateral varicosities and the reflexes were all physiological.

The blood sugar on admission was 200-mg. per cent. The urinalysis revealed a slight trace of albumin and a 2+ sugar. The red cell count was 3,930,000 with 12.5 gm. of hemoglobin. The white blood cell count was 13,910 with 80 per cent neutrophiles. An electrocardiogram revealed a sinus tachycardia. A flat plate and upright film of the abdomen and lower thoracic cage revealed some dilatation of the stomach and no evidence of free intraperitoneal air.

An abdominal exploratory laparotomy was performed July 4, 1953, about eight hours after admission. The surgeon noted that the adipose tissue had a peculiar pallor and was somewhat more firm in con-

°Presented at the Saint Louis County Medical Meeting on October 8, 1953 at Virginia, Minnesota.

sistency than usual. The appendix was missing, but there was injection and inflammation of the cecal diverticulum about the size and in the position of an appendix, which was removed. Histopathologic examination revealed an acute diverticulitis. The original symptom of abdominal pain persisted and the abdominal distention was not relieved by decompression. The blood sugars postoperatively ranged from 122 to 170-mg, per cent. The patient spiked a fever with a temperature as high as 105.8° F. rectally. On July 5, 1953 some edema and redness were noted in the incisional area and suture line. The morning of July 6, 1953, the abdominal incision was partially reopened and revealed only serous fluid. The pulse and heart rate became rapid but remained regular. The abdominal distention became more pronounced and a large area of reddish purple discoloration appeared early in the evening of July 6, 1953, which spread rapidly to involve the upper third of both the medial and lateral aspects of the thighs. A culture was taken from the previously reopened abdominal incision and revealed a pure culture of aerobic hemolytic Staphylococcus aureus. The patient became progressively worse and expired at 11:30 P.M. on July 6, 1953, two days after admis-

The essential necropsy findings were: (1) mild localized peritonitis and cecitis, (2) diverticulitis of cecum and diverticulosis of cecum and sigmoid, and (3) necrotizing cellulitis of the abdominal wall.

No direct source of infection could be demonstrated to account for the rapidly spreading necrotizing cellulitis. The histopathologic picture was that of a necrotizing inflammation of the abdominal wall with neutrophilic infiltration and thrombosis of the nutrient vessels of the skin.

#### DISCUSSION

This clinical entity may be seen once or twice in the average surgical practice.1.2 The majority of the reported cases of synergistic gangrene occurred at either the site of trauma or in the postoperative wound, but may originate from a variety of infectious processes of the skin. Many of the cases followed trivial wounds and operative procedures. 1-9, <sup>12.14</sup> The etiologic agents in synergistic gangrene are usually a combination of two or more organisms with or without the production of gas. In a series of 12 cases, the most frequent combination was aerobic nonhemolytic streptococci with Escherichia coli and anaerobic bacillus melanenogenicum with anaerobic streptococcus. In the same series, 2 cases were reported due to hemolytic Staphylococcus aureus in combination with either anaerobic bacillus melanenogenicum, aerobic bacillus pseudodiphtheriae and/or anaerobic nonhemolytic staphylococcus. In our case, we found that the isolated organism was a pure culture of aerobic hemolytic Staphylococcus aureus.

The necrotizing effect of staphylococcus exotoxin with ability to enhance the coagulability of the blood and subsequent thrombosis, cannot be totally discarded as a possible pathogenesis. 10,11,13

The following classification of infectious gaugeene of the skin by Meleney<sup>5</sup> is probably the most widely accepted:

Acute. (1) Gas gangrene, (2) hemolytic strepto-

coccus gangrene, and (3) crysipelas.

Chronic. (1) Progressive bacterial synergistic gangrene, (2) gangrenous impetigo (ccthyma), (3) fusospirochetal gangrene, and (4) amebic gangrene of skin.

This clinical entity is characterized by a rapidly spreading necrotizing and sometimes emphysematous infection of the skin and subcutaneous tissue with severe toxemia. The temperature in a series of 12 cases¹ averaged 104° F, with an average white blood cell count of 23,230 and a relative polymorphonuclear leukocytosis. The first subjective symptom was pain which preceded the swelling and erythema by one to three days. A corresponding increase occurred in both the pulse and respiratory rate. The pain increased with associated pronounced tenderness as the gangrenous cellulitis progressed, followed by signs of marked toxemia.

The pathologic picture is that of rapidly spreading necrotizing and, at times, a crepitant inflammation of the skin and epifascial connective tissue. The thrombosis of the nutrient vessels of the skin is a prominent histopathologic feature. Cultures from the central portion of the gangrenous process may not reveal the true bacterial composition. Microaerophilic streptococci have been found in pure culture far out in the relatively normal appearing tissue.<sup>5,8</sup> In our case the cultures were taken from the central portion of the reopened abdominal incision. Additional cultures from other areas may have revealed

a symbiotic bacterial flora.

The low incidence of this clinical entity is probably the basis for the lack of familiarity and recognition of the condition. The diagnostic acumen can undoubtedly be enhanced by suspicion, surveillance, and scrutiny of the patient. The treatment is based on early recognition and adequate bacteriologic studies before the patient slips into the critical phase. The treatment of choice is early and radical incisions of the skin and subcutaneous tissue to points well into healthy tissue peripherally and down through the superficial layers of the deep fascia. 1,3,5,8 The use of zinc peroxide locally plus chemotherapeutic agents as adjuncts are effective. 1,6,7,9

#### SUMMARY

1. We have reported a fatal case of necrotizing cellulitis of the abdominal wall in a diabetic patient due to aerobic hemolytic Staphylococcus aureus.

2. In retrospect, the presence of symptoms out of proportion to the clinical findings, plus the peculiar pallor and firmness of the adipose tissue at the time of exploratory laparotomy, should have aroused suspicion.

3. The fact that the symptoms and clinical findings persisted after diverticulectomy and that the process spread rapidly, points to the probable presence of the infection prior to the surgical procedure.

(Continued on page 503)

## Conference Highlights, A Look to the Future

DANA L. FARNSWORTH, M.D.

Cambridge, Massachusetts

This conference has been notable because it has proceeded almost exactly according to plan. The program itself was a result of two years of thinking, planning, and exchange of opinions and past experience on the part of at least 150 persons. The final theme of the conference as described beforehand was "Teamwork in Meeting the Health Needs of College Students." Certainly, if any large group ever exhibited teamwork in the grand manner, this was it.

Certain general principles in the behavior of human beings seem applicable to almost all situations within the ordinary range of experience. These are:

1. All persons like to be treated as individuals and have their desires considered.

2. Sentiments and feelings are facts whether based on logical or illogical premise.

3. People usually like to be considered as members of a team.

4. Activity tends to mirror itself in the activities of others. If one is friendly, those around him tend to be friendly. If one is rigid, hostile, or suspicious, those around him tend to be likewise.

Good communication at all levels is fundamental. Many difficult issues can be resolved if the different viewpoints are brought to common attention.

These principles were much in evidence here. In all committee reports you will note that good communication was stressed as being of fundamental importance. What is new about this conference is that communication is presumed to be desirable, not only between the health director or worker and the administration and student, but that a web of channels be set up by which ideas may be exchanged quickly and with a minimum of formality.

The superlative talk by Dr. Rusk epitomized another point of view that has permeated the thinking of all members of this conference and which has formed the priceless ingredient of medical practice in the past. This ingredient is compassion, the consideration of the human being in all his needs, or as Schweitzer would put it, reverence for life. One of the most exquisite forms of happiness is derived from looking back over a most difficult set of experi-

DANA L. FARNSWORTH, a 1933 graduate of Harvard Medical School, was 1953-54 president of the American College Health Association, chairman of the Fourth National Conference on Health in Colleges, and medical director of the Massachusetts Institute of Technology, 1946-54. He was recently appointed Henry K. Oliver Professor of Hygiene and director of all health services at Harvard.

ences which resulted in helping someone who was in trouble. From that point of view, the busy and troubled life of the person who tries to promote health in all its aspects is one of the most satisfying that can be imagined. The college can no longer be looked upon as an ivory tower, a place where we happy few are fortunate enough to live a life of leisure and contemplation. It is rather a place where things of highest value are valued highest. The sense of dedication which has motivated health workers in the past is one which we should not allow to die and one of which we should not be ashamed.

There are certain areas in which a sort of dichotomy appears which is usually more apparent than real and the resolution of which requires a form of maturity that is difficult for most of us to achieve. One of these sets of possible controversies revolves around the relative duties and responsibilities of psychiatrists and psychologists. Another involves the role of physicians and nurses in contrast with that of health workers. Safety and medical groups are sometimes competitive rather than cooperative. Another centers around the different points of view of the dean and administrative officers of the college who must think primarily in terms of the whole institution and the physician who must of necessity think primarily in terms of the individual. A lesser one is the traditional opposition of student against faculty, and we have seen, particularly in the committee on Student Participation in Health Planning, that this supposed conflict is not necessary.

Dr. Pusey's comment that health teaching and promotion should be done by indirect methods rather than by required courses is indeed correct for his own and for many large institutions, but not for many others. Whether or not a health course is worthwhile, or whether it will be accepted, depends upon the skill and imagination of those who organize and teach it. Here at Columbia under Dr. Stewart, it has been demonstrated that such a course can not only be of intense personal value to students, but be enjoyed and accepted as well.

The apparent disagreement which frequently results between health workers and physicians can be resolved if there is good communication and good will on both sides. The physician has traditionally tended to think more in terms of disease than health,

(Continued on page 498)

Concluding remarks, Fourth National Conference on Health in Colleges, Hotel Statler, New York City, May 5, 1954.



SERVING THE MEDICAL PROFESSION OF MINNESOTA, NORTH DAKOTA, SOUTH DAKOTA AND MONTANA

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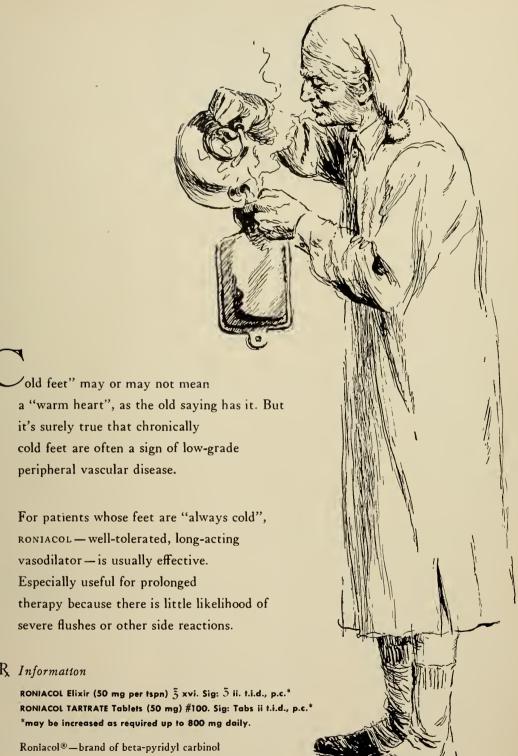
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R Information

Textbook of Pediatrics, edited by WALDO E. NELSON, 1954. Philadelphia: W. B. Saunders Co., 1581 pages. \$15.00.

This book is a continuation of the Mitchell-Nelson series of Textbooks of Pediatries. Dr. Nelson of Temple University is the editor, and a long and notable list of contributors have collaborated to produce a well con-

It is clear from a careful perusal of the volume that the authors have succeeded in making the text as representative as possible of current pediatric thought and practice. Some sections of this well-known textbook have been completely rewritten and some new ones added. The extensive, personal experience shared by the large number of contributors, and the expert knowledge of many branches within the larger specialty of pediatric medicine, give the book an unmistakable air of authority and

The volume is naturally quite large, containing as it does a very extensive list of subject matter. The book will undoubtedly serve as an excellent source of information not only for general practitioners and pediatricians, but for specialists in the various medical areas where we find some of our younger patients.

character.

The text is well printed and liberally illustrated. Each section has an extensive bibliography and there is an adequate subject index. All in all, this volume maintains the high quality set by previous editions. REUBEN F. ERICKSON, M.D.

The Concept of Schizophrenia, by W. F. McAuley, M.D., 1954. New York City: Philosophical Library, Inc., 145 pages. \$3.75.

This is the best little book we have seen on this subject, which was written by a psychiatrist working in northern Ireland. He writes clearly and interestingly and shows a wide acquaintance with the literature. He abstracts the views of Kraepelin, Bleuler, and others in regard to schizophrenia, and discusses briefly but adequately all phases of the subject, including the physiological and biochemical. Chapter 2 discusses the dynamic concepts of schizophrenia, and a good discussion of the role of heredity is included in chapter 3. In this latter chapter the author tells of the work of many men who have estimated the frequency with which schizophrenia appears among the relatives of schizophrenics.

Chapter 4 deals with the im-



pingement of social and environmental conditions upon the personality of the individual who is predisposed to schizophrenia. The neurophysiology and metabolism of these people are discussed. A good chapter on diagnosis tells of some of the early symptoms, such as excessive worry and hypochondriasis, which cause the patient to keep going from one doctor to another, often resulting in an operation instead of the treatment really needed.

This is an excellent book for the young physician who wants to learn something about psychosis.

WALTER C. ALVAREZ, M.D.

Nash's Surgical Physiology, revised and edited by BRIAN BLADES, M.D., 1953. Springfield, Illinois: Charles C Thomas. 686 pages. \$12.50.

The second edition of Nash's Surgical Physiology has undergone considerable revision and amplification. A number of interesting illustrations have been added, and the printing and arrangement have been made more readable. Basically, the book deals with practical physiologic considerations as applied to clinical surgery. The material is arranged according to the major body systems, dealing successively with the cardiovascular system, burns and tissue repair, the respiratory system, the gastrointestinal system, the body fluids, the kidneys, the endocrine system, and the nervous system.

An interesting new chapter deals with recent advances in cardiovascular surgery. The second on the adrenal glands has likewise received an expanded treatment. In an undertaking of this nature, the tendency is to become dogmatic at times and to retain some views which are generally considered no longer valid. While this criticism is also true of this work, the authors have succeeded in covering with precision a vast amount of material without becoming lost in a myriad of details. The clinical surgeon is able to orient himself quickly with regard to physiology as applied to his field

of interest while the number of current references in the text offer him a springboard from which he can leap into the current literature if he wishes more details.

This work should be of particular interest to the surgical intern and resident as well as the practicing surgeon who wish a brief review of major physiologic principles as applied to surgery.

WILLIAM D. KELLY, M.D.

A Social Program for Older People, by Jerome Kaplan, 1953. University of Minnesota Press. 158 pages. \$3.00.

In the last few years we have been hearing that all old persons should prepare for retirement, but seldom have we been given much detailed information on just what elderly people can do or what can be done for them by those who would like to help. So often as we read these articles, we feel that the author is an armchair philosopher, without much firsthand information or any experience in dealing with the problem.

This if the first book on this subject that I have seen that has satisfied me. Mr. Kaplan evidently has had a large experience in helping older people. He has been the group work consultant for the Hennepin County Welfare Board in Minnesota. He is the secretary for the Minnesota Commission on Aging, and he received the 1952 Survey award for his imaginative and constructive contributions to social work.

In 9 chapters Mr. Kaplan takes up such subjects as the challenge of the older ages and the over-all pattern; the social group worker; the volunteer; how to organize a group; what to do for a program; how to increase participation; the role of homes for the aged; and fun in the out-of-doors through camping.

Pages 93 and 94 list all of the various occupations and educational programs that have been suggested

for old people.

Doubtless in most communities, and especially those in which many persons are retired, there must be many who still have a good deal of drive and who are capable organizers. Many of these executives could help tremendously in organizing groups of older people and in helping them to be happy and useful. Suggestions, advice, and guidance for a happy life in old age are ably supplied by Mr. Kaplan.

WALTER C. ALVAREZ, M.D.



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3.50%	5.00%	5.65%	7.45%			
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4.00%	5.71%	6.45%	8.51%			
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### A.C.H.A. News

THE A.C.H.A. committees and chairmen for 1954-1955 are:

Health instruction—Dr. A. O. DeWeese, Kent State University, Kent, Ohio

Health service and physical activities—Dr. John G. Grant, Iowa State College of Agriculture and Mechanical Arts, Ames

Administration—Dr. Ralph I. Canuteson, University of Kansas, Lawrence

Research—Dr. John Summerskill, Cornell University, Ithaca, New York

Environmental hygiene—Mr. Richard Bond, University of Minnesota, Minneapolis

Faculty medical care—Dr. John E. Sawhill, New York University, New York City

Records—Dr. Dana L. Farnsworth, Harvard University, Cambridge, Massachusetts

Tuberculosis—Dr. Max Durfee, Oberlin College, Oberlin Ohio

Mental hygiene—Dr. C. Douglas Darling, Cornell University, Ithaca, New York

Editorial—Dr. Irvin W. Sander, Wayne University, Detroit, Michigan

The thirtieth annual meeting of the Ohio College Health Association was held October 22 and 23 at the University Health Service of Western Reserve University and Case Institute of Technology in Cleveland. The annual dinner was held on Friday evening, October 22 at the Cleveland Health Museum with Dr. Bruno Gebhard, director of the Museum, as guest speaker. The title of his address was "Seeing is Believing." Officers elected for the coming year are: president, Max L. Durfee, M.D., Oberlin College; vice-president, William T. Palchanis, M.D., Ohio State University; secretary-treasurer, Eleonora L. Schmidt, M.D., Ohio University; executive committee: Karl H. Feistkorn, M.D., Ohio State University; Charles L. Hudson, M.D., Western Reserve University; Carl Jenkins, M.D., Wilberforce University; Wilder P. Ellis, M.D., College of Wooster; Mrs. Ruth Dutton, R.N., Miami University; and Ted Allenbach, M.D., ex-officio, Ohio State University.

The annual meeting of the Illinois section of the A.C.H.A. was held on Saturday, December 4, at Roosevelt University, Chicago. Dr. William Lester, Jr., president of the Illinois section, issued a cordial invitation to all student health personnel in the Midwest to attend. The day's activities included:

9:30 A.M.—Registration

10:00 A.M.—Greetings—Dr. Sam C. Udell, director of student health service, Roosevelt University

10:15 a.m.—Teaching of Hygiene to College Students—Dr. Earle B. Erskine, director of student health service, Navy Pier Branch, University of Illinois

10:45 a.m.—Health Teaching Through Nursing—Miss Velma Arnold, Illinois Wesleyan University, and Miss Laura Ydse, University of Chicago

11:30 a.m.—Behavior Disorders in College Students—Dr. Clifton C. Rhead, assistant director, student health service, University of Chicago

12:00 NOON—Luncheon—Address: Health as an Objective of a College Education, Dr. Edward J. Sparling, chancellor, Roosevelt University

1:30 P.M.—Business meeting and election of new officers

2:00 P.M.—Recent Developments in the Study of Respiratory Diseases—Dr. Thomas Grayston, University of Chicago

2:45 P.M.—What Should be the Function of a College Health Service?—Dr. Henry G. Poncher, director, student health service Valparaiso University, Valparaiso, Indiana

3:30 P.M.—Open discussion on Health Service Problems— Question period

4:00 P.M.—Conclusion

Plans are getting under way for the program of the annual meeting of the A.C.H.A. at Colorado Springs, April 28, 29, and 30, 1955. Dr. Lewis Barbato of the University of Denver is chairman of the Local Arrangements and Program Committee. Tentative planning calls for a panel report and discussion of committee activities by the chairmen of the A.C.H.A. committees on Thursday afternoon, April 28. All committee chairmen should write immediately to the secretary giving the membership of their committees so that their appointment may be made official, and to Dr. Barbato for any suggestions or instructions concerning their part of the program.

The secretary's office and Dr. Barbato will appreciate suggestions concerning items, titles of papers, or special subjects which it is felt might become a matter of asso-

ciation consideration.

A splendid scientific program is being arranged and all members of the association should make their plans now to be present in Colorado Springs.

Dr. Viggo W. Jensen has been appointed full time psychiatrist at the Wayne University Health Service beginning October 4, 1954. Dr. Jensen had extensive psychiatric experience in the armed services during World War II and comes to Wayne University after three years as assistant director of the Psychiatric Division of Detroit Receiving Hospital.

A book of building plans compiled from the structures of the various health services in the United States and Canada is available on a loan basis from the secretary's office. Any institution contemplating a health service building program may apply to the secretary's office for these plans.

The secretary's office would appreciate a copy of the final plans of health service quarters from any school that has recently completed a new building or altered an old one so that they may be included in this book.

Dr. Murland Fish has been appointed to assist Dr. Harry E. Zion, director of student health at Washington State College, Pullman, Washington. Dr. Fish was a high school teacher and principal before becoming a physician and for the past eight years has been in pri-vate practice in Auburn, Washington. He is particularly well suited for work which involves meeting and caring for students.

Dr. Norman R. Sloan, now stationed on Canton Island in the Pacific, has indicated to the secretary's office that he is interested in entering into student health work upon his release from service in the summer of 1955. Any college or university contemplating an addition to their staff for the next school year might be interested in writing to him. His address is as follows: Dr. Norman R. Sloan, c/o C.A.A., P.O. No. 06-50,000, Canton Island, U.S.A., South Pacific. Communications should be sent air mail as other mail service is not available. Details of Dr. Sloan's background are also available from the secretary's office.



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(Continued from page 488)

but he is gradually changing his point of view. Yet, at the same time, a large segment of the medical profession must think in terms of disease if disease is to be controlled or eradicated to an increasing degree. If the health program and the health service are parts of a well integrtaed unit, health building is much more apt to be achieved in an optimum manner. Some one person, committee, or council should be in charge of coordinating all the health promoting activities of the college.

The ideal health program which needs this co-ordination consists of health service, physical education, health education - direct and indirect, a safety and environmental health program with both physical and social factors in mind, research, a recreational program, close collaboration with colleagues in all other college departments, but most of all an attitude of cooperation and understanding on the part of all who participate in it. Through all these channels favorable attitudes toward health-building are encouraged in faculty and students. A touch of realism should be present in that all who receive benefits should know what their health service costs and help plan how to meet those costs. Acceptance of the important principle that the health service always remains in an advisory, investigative position is very helpful in maintaining harmonious relationships with others in the college.

À quite important advantage that is being registered in this conference concerns the making and using of student health records. If health records are to be of any use in promoting health, they must be in a usable form. If they are used by everyone who is interested, they will be of no value because students will not confide in any person who does not respect their confidences. The committee on Health Records has evolved a set of principles which, if followed in spirit, will make it possible to achieve both objectives of making health records usable and retaining students' confidences in the health service. If every person connected with an institution has a full health record which is available to the proper authorities, many problems become insignificant.

We have also seen that if counseling is considered practically equivalent to teaching but with emphasis on the contacts outside the classroom, it can be done by almost every member of the staff, faculty, and even by some upper classmen. On the other hand, no counselor can be expected to cope with the complicated problems that arise when severe emotional conflicts are present. If the teacher and the trained professional counselor and the psychiatrist recognize clearly the special spheres of influence, there need be no basic conflict. The skills of persons need to be matched with the needs of the students. Referral of a student to a person with special skills should be looked upon as a sign of strength in the individual who has recognized that it is beyond his ability to cope with the problem.

Just as teamwork is envisaged as a web of communication channels and possibilities for action, so the channels are beginning to extend out into the community, and, as Dr. Rusk and Dr. Turner have so eloquently stated, throughout the world. Through the medium of cooperation with the numerous health agencies in this country, and through public education on the radio and television, health principles may be furthered.

And now, A Look to the Future. The big problem of this conference is the implementation of the thousands of good ideas that have been expressed here. We have channels for this implementation through the 46 agencies which have united in sponsoring this conference and through the 757 colleges which have a health service. We have potential channels in the other 1,100 colleges which seemingly do not consider health needs as a part of the total process of education. The regional associations that make up the National Accrediting Commission may use our findings in connection with their evaluation of the health programs of the colleges they evaluate. As Dr. Turner has pointed out, we have an eager audience in the form of numerous organizations in many countries outside the United States who look to us for suggestions as to how they may adapt our ways of building health to the special needs of their own countries. It seems reasonable to suppose that separate sections of the proceedings may be reproduced for the use of special groups. An objective as worthy as this should command some financial support if there are any groups who really want to promote health through the wise use of money. There is room for a series of monographs to be developed from germinal ideas expressed in this conference. We noted that one student was writing his term paper on the subject of one of our committee deliberations. A good book might well be written on this conference including ideas expressed here but written in a somewhat different form than a compilation of proceedings. If as much imagination is used by members of this conference in implementing what they have learned here as has been expressed while they have been working here, I am sure that health programs in colleges will develop and improve at an accelerated rate during the next decade.

What we have done here then is to illustrate in an admirable manner how large numbers of people can work together constructively. Perhaps this demonstration will serve to convince us that the disparity between scientific and cultural progress and between physical and mental health which we spoke of at the beginning of the conference can still be overcome. Public morality is an extension of many private efforts at maintaining health. The two are much more related than they may seem on the surface. What I have obtained from this conference and what I hope that you have gained is the firm conviction that no problem is too difficult to solve or to endure if we learn to live together in health and harmony.

I look forward to a still more successful Fifth Conference sometime in the 1960's.

I now declare the Fourth National Conference on Health in Colleges adjourned.

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# Advanced Hypertension

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for moderately severe to severe hypertension which does not respond adequately to Rauwiloid or other rauwolfia preparations alone. Makes Veriloid effective in better tolerated Initial dosage, 1 tablet t.i.d., p.c. In botdosage.

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PEDIATRIC DROPS: Cherry flavor.
Approx. 5 mg. per drop.
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ACHROMYCIN is definitely less irritating to the gastrointestinal tract. It more rapidly diffuses into body tissues and fluids. It maintains effective potency for a full 24-hours in solution.

ACHROMYCIN has proved effective against a wide variety of infections including those caused by Gram-positive and Gram-negative bacteria, rickettsia, and protozoan organisms.

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to increase antibacterial range and reduce resistance . . .

Three strengths: 125M, 250M, 500M

#### Each tablet contains:

Penicillin G Potassium, Crystalline 125,000 (or 250,000 or 500,000) units

Sulfadiazine . . . . 0.167 Gm. Sulfamerazine . . . 0.167 Gm. Sulfamethazine . . . 0.167 Gm.

#### Supplied:

Scored tablets in bottles of 50. Biosulfa 125M also available in bottles of 500.

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THE UPJOHN COMPANY, KALAMAZOO, MICHIGAN

### News Briefs . . .

#### North Dakota

A PSYCHIATRIC nursing eourse is now offered at the North Dakota State Hospital at Jamestown. It is the first time in the history of nursing in the state that student nurses from North Dakota schools of nursing have been able to take this course at a North Dakota hospital. Necessary appropriations for the course were provided by the last legislature.

THE DICKINSON CLINIC, after completion of the extensive remodeling project tentatively set for around the first of the year, will occupy the entire second floor of the First National Bank building in Dickinson. New examining rooms, expanded laboratories with new equipment, and an oil-hydraulic clevator large enough for wheel-chair patients are among the new additions.

Dr. John H. Moore, physician at the Grand Forks Clinic, was among the speakers at the recent annual convention of the Manitoba Medical Association held in Winnipeg.

Dr. K. N. Amstutz, who was affiliated with the Northwest Clinic in Minot before being recalled to duty in the United States Navy two years ago, has rejoined the elinic staff. Dr. Amstutz, a specialist in internal medicine, graduated from the University of Michigan medical school in 1944 and, after a year of internship, entered the Navy as a medical officer.

Dr. A. M. Miles, who has practiced in Rolla for the past six years, has received a three-year appointment for a postgraduate course in surgery at California and Santa Moniea hospitals. Dr. Milton Gilchrist has taken over Dr. Miles' practice.

DRS. CHARLES F. SCHNEE and GORDON ANDERSON recently joined the staff of the Harvey Medical Center. Dr. Schnee received his M.D. and M.S. degrees from McGill University. Dr. Anderson served five years in the Royal Canadian Air Force before attending and graduating from the University of Manitoba Medical College. He practiced in Powers Lake before joining the Harvey staff.

DR. GILBERT FISH, a Diplomate of the American Board of Surgeons, is now associated with the Garrison Clinic. Before accepting the position at Garrison, Dr. Fish practiced surgery in Mt. Vernon, New York.

Dr. Albert G. J. Cullum, specialist in diseases of the eye, ear, nose, and throat in Fargo since 1950, has become an associate in the medical offices of Dr. John J. Ayash of Minot.

#### Minnesota

MANY NOTED physicians gathered October 21 and 22 on the University of Minnesota campus for the dedication of the new Mayo Memorial Building. A tribute to the Drs. Charles and William Mayo, famed Rochester surgeons who died in 1939, the 14-story structure provides space for offices and laboratories of the departments of medicine, surgery, pediatrics, psychiatry, physical medicine and rehabilitation, bacteriology and immunology, radiology, continuation medical education, and the school of public health. A large suite of oper-

ating rooms and many conference rooms are also included. Thousands attended the tours conducted through the building October 21 and 22. A high point at the dedication banquet was the presentation of the "Builder of the Name" award to Dr. Donald J. Cowling by President Morrill.

Dr. Raymond Pruitt has been promoted from associate professor of medicine of the Mayo Foundation to full professor and named associate director of the foundation by the University of Minnesota board of regents. Dr. Pruitt has been a consulting physician at the Mayo Clinic since 1943.

Dr. Robert A. Good has been promoted to American Legion Memorial research professor by the University of Minnesota board of regents. Dr. Good replaces Dr. Lewis Thomas, who came to the university in 1950 as the first American Legion research professor and who has resigned to become professor of pathology at New York University.

The following Virginia physicians have been named as consultants to the medical staff of the International Falls Memorial Hospital: Harrison E. Law, surgery; Jack R. Pierce, obstetrics and gynecology; Walter S. Neff, internal medicine; and David A. Sher, pediatrics.

#### NONCLOSTRIDIAL GANGRENOUS CELLULITIS OF THE ABDOMINAL WALL

(Continued from page 487)

4. The early recognition of this clinical entity and adequate treatment might have prevented an unnecessary death.

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#### FRYTHROMYCIN

the antibiotic of choice against resistant Gram-positive cocci . . .

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to cover Gram-negative bacteria and to potentiate the erythromycin . . .

#### Each tablet contains:

Erythromycin . . . . . 100 mg. Sulfadiazine . . . . 0.083 Gm. Sulfamerazine . . . 0.083 Gm. Sulfamethazine . . . 0.083 Gm.

Protection-coated tablets in bottles of 50 and 500.

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THE UPJOHN COMPANY, KALAMAZOO, MICHIGAN

### Advertisers' Announcements

MODERN ORAL MERCURIAL DIURETICS SAID TO CONTAIN
LITTLE METALLIC MERCURY

Do present day oral mercurial diuretics contain much metallic mercury? This interesting question was posed recently by a physician and answered in the "Diuretic Forum" section of Diuretic Review, publication distributed to the profession by Lakeside Laboratories, Inc., Milwaukee.

In contrast to the old inorganic mercurials such as the "blue pill" and calomel, the reply points out, modern oral mercurials are organic compounds found to contain no freely ionizable mercury.

Official tests of the A.M.A. Council on Pharmacy and Chemistry revealed an "absence of ionizable mercury and other heavy metals" in a leading oral mercurial diuretic,

it is pointed out.

"In comparison with an average 100-mg, dose of calomel which contains approximately 85 mg, of ionizable mercury, there are only 10 mg, of organically-bound mercury in one tablet" of this oral mercurial, the article concludes.

#### ROBINS CONDUCTS STUDY

To determine the effect of Robalate (Robins) and other tablet antacids on peptic ulcer is the subject of a study directed by Dr. Regis A. Wolff, chief of the gastroenterology clinic, and Dr. Harry Baird of Allegheny General Hospital, Pittsburgh. Dr. William R. Bond, director of clinical research of the A. H. Robins Co., Inc., Richmond, Va., announced the grant. The study is to be completed in six months.

### BENADRYL FOUND TO AFFORD GREATEST PROTECTION AGAINST MOTION SICKNESS

A controlled study of the effects of 5 different drugs on 838 soldiers during a voyage between New York and Bremerhaven, Germany, showed Benadryl afforded the greatest protection against motion sickness and was "significantly free of all untoward side-effects."

Prior to sailing, the soldiers filled out questionnaires on age, weight, and previous history of motion sickness. Each man was assigned a separate number, and the medications—as well as placebos—were distributed consecutively. All the men received a total of 6 doses of the drugs or placebos.

The roughness of the voyage was demonstrated by the fact that 34 per cent of the 135 men who received placebos suffered emesis, compared with only 12.9 per

cent of the 140 given Benadryl.

Benadryl was used in the study as the positive control and, in doses of 50 mg. three times a day, afforded 62 per cent protection from emesis.

#### AUREOMYCIN FOR PREVENTION OF PSITTACOSIS

Psittacosis, or parrot fever, which has worried public health officials because of the popularity of parakeets as pets can be eliminated if the breeders have the birds treated with Aureomycin chlortetracycline or Achromycin tetracycline, K. F. Meyer and B. Eddie of the George Williams Hooper Foundation, University of California, San Francisco, reported at the second annual Symposium on Antibiotics sponsored by the Antibiotics Division of the Food and Drug Administration. Aureomycin is regularly used to cure human beings who contract the disease from birds.

The California investigators gave 2 daily injections of Aureomycin or Achromycin to 181 parakeets for fourteen days from flocks known to be infected with latent psittacosis. All of the birds sacrificed proved free from psittacosis, and no evidence of infection was found in their

Squabs in various stages of natural, acute, and latent ornithosis, which proved fatal to 50 per cent of untreated birds held under observation as controls, were freed from the infection when injected three times a day for twenty-five days.

#### YUVRAL, A NEW VITAMIN-MINERAL CONCENTRATE

This combination of components for youths and active adults has been placed on the market by Lederle Laboratories, Pearl River, New York. The minimum daily requirements of many vitamins and minerals are so much greater during periods of growth, that a special vitaminmineral concentrate is very often needed by this age group. Vitamin  $B_{12}$  and Purified Intrinsic Factor Concentrate are present in larger amounts than in geriatric preparations, as are vitamin A and calcium. The two former are vital growth factors and the latter are necessary for correct bone growth. The normal dose of Yuvral is 1 capsule daily.

#### SULFADIAZINE IS BEST FOR INFANT DIARRHEA

Sulfadiazine is the most effective medicine for infant diarrhea, according to a study made by a working party of the Antibiotics Clinical Trials Committee of the Medical Research Council of Great Britain. Their report on 1,168 cases treated in various ways is summarized in the July Modern Medicine of Canada.

"The progress of the sulfadiazine-treated patients was significantly better than that of any other treatment group," the article states. Estimation of progress was based on the duration of diarrhea, length of time required for full recovery, and the proportion of slight

symptoms that became severe.

The over-all death rate in the group was 2.8 per cent. It was highest—4 per cent—for those given no antibacterial drug at all, and lowest—1.6 per cent—for those treated with sulfadiazine.

#### INFECTIONS OF SURGERY YIELD TO TETRACYCLINE

Tetracycline hydrochloride has proved an effective treatment for infections arising from surgery, Drs. Aaron Prigot, James C. Whitaker, Boris A. Shidlovsky, and Milton Marmell of Harlem Hospital, New York, said at the second annual symposium on Antibiotics sponsored by the Antibiotics Division of the Food and Drug Administration. The new antibiotic was administered to 200 patients, both in capsule form taken by mouth and by injection.

Many cases were treated on an ambulatory basis, surgical procedures were fewer, and in many cases it was possible to perform a simpler operation. Side reactions were not severe and in only 1 case was it necessary to stop using the drug because of an allergic manifestation.

#### LEDERLE MARKETS BRUCELLA ABORTUS TUBE ANTIGEN

A tube agglutination test for the laboratory diagnosis of human brucellosis has been placed on the market by Lederle Laboratories, Pearl River, New York. Brucella Abortus Tube Antigen has been prepared and tested according to the recommendations of the committee on brucellosis of the National Research council. The committee has proposed the adoption of two measures in order that more uniformly consistent, comparable, and reliable agglutination test results may be obtained in











